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ABSTRACT

Part I of this two-part study compared prospective counselors' scores on selected measuring instruments at the beginning of their course work and practicum experience, and later at the end of their practicum experience. Part II examined the effect of a course in group counseling techniques on prospective counselors' self concepts, self images, social images, and interpersonal relations. Subjects were counselor trainees at North Texas State University during the period from 1968 to 1970. Instruments used were the Rokeach Dogmatism Scale, the Philosophies of Human Nature Scale, the Test of Counselor Attitudes, and Personal Orientation Inventory and the Counselor Rating Blank. Post-test results indicated that trainees made significant positive gains toward self actualization, and that those who participated in intensive group counseling, particularly as group leaders, evidenced greater positive change than those who did not serve as leaders. It is hoped that data gained from this study may be useful in critically evaluating specific aspects of a counselor education program. (Author/CJ)

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GROUP COUNSELING EXPERIENCES

Sharon Anderson
North Texas State University
Denton, Texas

November, 1970

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Office of Education
Bureau of Research

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November, 1970

Sharon Anderson

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AN ANALYSIS OF A COUNSELOR EDUCATION PROGRAM
WITH A CRITICAL EXAMINATION OF PRACTICUM AND
GROUP COUNSELING EXPERIENCES

Introduction

Summary

This study examined specific aspects (practicum and the teaching of a course in group counseling) of the counselor education program at North Texas State University, Denton, Texas. Part I of the study compared prospective counselors' scores on selected measuring instruments at the beginning of their theory and methodology course work, at the beginning of their practicum experience, and at the end of their practicum experience. Consideration was given to the changes in attitudes, personality, and effectiveness made by the prospective counselors between each of these points in their training. Part II of the study examined the effect of a course in group counseling techniques on prospective counselors' self-concepts, self-images, social images, and interpersonal relations. Four experimental treatment categories were applied to the teaching of the group counseling course, and the extent to which those treatments influenced the self of the prospective counselors was considered.

Subjects for Part I of the study were all students who entered the counselor education program at NTSU in the fall of 1968. These subjects were followed through the summer session of 1970. A control group was established using all students entering the graduate program in elementary and secondary education at NTSU in the fall of 1968. Subjects for Part II of the study were all counselors-in-training who were enrolled in the group counseling classes from the spring semester of 1969 through the spring semester of 1970. Control subjects were prospective counselors who were asked to postpone enrollment in the group counseling class for one semester and enroll in another course in the counseling program.

The objectives of Part I of the study were to compare the relative amount of change in personality, attitude, and rated effectiveness that occurred during the two major phases of the counseling training program. These were the: (1) course work, methodology and theoretical study phase, and (2) practicum experience, during which the trainees apply their learnings in actual counseling situations, with supervision, criticism, and guidance from the faculty. These two changes were compared to the

change that occurred during a similar time period for a control group of students in graduate education programs other than the counseling and guidance program. The specific hypotheses were:

1. On the Rokeach Dogmatism Scale (RDS):

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

2. On the various sub-scales of the Philosophies of Human Nature Scale (PHN):

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

3. On the various sub-scales of the Test of Counselor Attitudes (TCA):

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

4. On the various sub-scales of the Personal Orientation Inventory (POI):

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;

- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

5. On the Counselor Rating Blank (CRB), the pre-test mean scores will not differ significantly from the mean post-test scores. Only the experimental group is rated on this instrument at points b and c (at the beginning of the practicum and at the end of the practicum).

Parts a and b of hypotheses 1-4 were tested, using a two-group analysis of covariance design. Since the criterion scores were actually difference scores between pre- and post-tests, the corresponding pre-test was used as a covariate or concomitant variable. This permitted the comparison of difference scores for different groups (with possible different initial levels on the instruments) and difference scores taken at different points in time (e.g., the course work and practicum phase of the program. Sub-hypotheses c of hypotheses 1-4 and hypothesis 5 were tested using the T ratio for differences between means where the scores were correlated.

Part two of the study examined the differences (post-test minus pre-test) attributable to two primary treatments. The main objectives were to determine the relative effectiveness of experiencing intensive group sessions and conducting group sessions (and also the interaction of these treatments). Two additional treatments were introduced by the presence of a control group (which did not experience the group counseling course at all, during which the two primary treatments occurred) and the time during which enrollment occurred (summer session or the longer fall-spring semesters). The four treatments were then: (1) experiencing group session (I_1) versus not experiencing group sessions (I_2); (2) conducting group session (C_1) versus not conducting group sessions (C_2); taking a course in group counseling (L_1) versus not taking the course (L_2); and (4) enrollment during the summer session (T_1) versus regular fall-spring semesters (T_2). The objectives of this part of the study were to examine the effects of these treatments on changes in interpersonal relations, self-images, self-concepts, and rated qualities of counselors. The specific hypotheses were:

1. There are no significant differences in criterion scores (post-test minus pre-test) between levels of treatments (a) L_1 and L_2 , (b) C_1 and C_2 , (c) I_1 and I_2 , (d) T_1 and T_2 , for students with the same scores on the concomitant variables (pre-test scores).
2. Any criterion score differences between treatment levels for any independent variable (L, C, I, or T) do not differ significantly between the treatment levels of any of the other three independent variables, with which it exists in combination.

Since the design was highly confounded (see Figure 3-1 in Methodology and Design section), hypothesis one was tested by performing a series of four 2-group analyses of covariance, using all of the pre-test scores as concomitant variables. Hypothesis two, which examined the possible first order interactions between pairs of treatments, also retained all pre-test scores as concomitant variables.

Results of Part I of the study indicated that:

1. Prospective counselors demonstrated an increase in their philosophic commitment to independence; whereas the control group did not change in this direction.
2. The experimental group (counselors-in-training) altered its attitude toward probing and interpretive responses as measured by the TCA.
3. Prospective counselors tended to become somewhat less accepting of their natural aggressiveness during the coursework phase of the program.
4. The experimental group (prospective counselors) made significantly positive gains toward self-actualization as measured by eight of the sub-scales of the POI.
5. No significant changes in scores occurred for the experimental group or the control group on the RDS or the CRB.

Results of Part II of the study indicated that:

1. The experimental group was superior to the control group in the amount of positive change made on the Self-Image Questionnaire-Self (SIQ-Self), Social (SIQ-Social) and on the CRB.
2. The control group experienced more positive change on the Expressed Inclusion scale of the FIRO-B than the experimental group, with this difference being more pronounced in the summer than during the fall-spring semesters.
3. Counselors-in-training who conducted their own groups as part of their training tended to have more positive change on the CRB than those who did not function as group leaders.
4. Prospective counselors who experienced intensive group counseling sessions as participants evidenced greater positive change on the CRB and the SIQ-Self than those who did not have this experience. This superiority of the intensive group experience

treatment for the CRB scores was increased if the prospective counselors also conducted groups of their own. This superiority is decreased for the SIQ-Self.

5. Prospective counselors who experienced intensive group sessions evidenced negative change on the Expressed Control scale of the FIRO-B.
6. The summer session versus fall-spring semesters "treatment" did not appear to produce any significant difference itself, but it appeared to mediate the effects of the experimental-control treatment on the Expressed Inclusion scale of the FIRO-B and SIQ-Social and the conducting group's treatment on the CRB.

It is the feeling of the investigator that some general observations about this study would be appropriate. It was hoped that data gained from this study could be useful in critically evaluating specific aspects of a counselor education program (practicum experience and the teaching of a course in group counseling). Since there were indications that the practicum was doing something significant to change the attitudes and personality of prospective counselors (as measured by the POI), the investigator suspects that perhaps other changes were taking place which were not measured by the other instruments. It also should be emphasized that the group counseling course appeared to produce desirable changes in the direction of personal growth, especially when the full treatment model was used.

Statement of the Problem

The overall purpose of this study was to investigate certain aspects of the counselor education program at North Texas State University. One of the major purposes of this study was to investigate the effect of the counselor education program on prospective counselors' attitudes, personality, and effectiveness. A more specific purpose was to compare the changes made on selected measuring instruments by the prospective counselors at the beginning of their theory and factual course work, at the beginning of their practicum experience, and at the end of their practicum experience. A basic question to be answered was: Do prospective counselors make the most changes in attitudes, personality, and effectiveness as a result of their course work or as a result of their practicum experience? This part of the study will hereafter be referred to as Part I.

The second major purpose of the study was to investigate the effect of a course in group counseling techniques on prospective counselors' self-concepts, self-images, social images, and interpersonal relations. A more specific aspect of this purpose was to determine the extent to

which four categories of treatment, which were applied to the teaching of a course in group counseling, influenced these variables. This portion of the study will hereafter be referred to as Part II.

Background and Need

As society places more demands upon individuals, the need for counselors in public schools, junior colleges, universities, mental health centers, and industry increases. These counselors will be assisting people to achieve fulfilling interpersonal relationships and a measure of personally satisfying growth toward self-realization in a complex society. These counselors must be able to accomplish the same goals for themselves. Thus, it becomes important to examine the preparation of counselors and to consider the kinds of personal growth experiences provided by their education.

With these factors in mind, NTSU was selected as an institution to sponsor such a study because of its well-established counselor education program. A large number of the counselors who are trained in Texas are products of the NTSU counseling program. Since this institution is interested in examining the kinds of experiences it provides counselors-in-training, its administrators and counselor educators were willing to participate in this study.

Significance of the Study

Historically, the practicum experience has proved to be a meaningful part of counselor preparation programs. Many questions concerning the value of the practicum have plagued counselor educators, and some of these questions remain as vital concerns. This study deals with some of the significant questions surrounding the practicum. Likewise, group experiences have found their way into counselor education programs and appear to be there to stay. Many of the same kinds of questions concerning these group experiences are unanswered. Again, this study deals with some of these questions.

As the demand for more trained counselors increases, the need to evaluate graduate training programs for counselors becomes more apparent. Those who designate the qualifications for counselors and for the professional certification of counselors have stressed the need for further study of the experiences which the counselor training program provides (2, 3, 17).

It is apparent that the counselor's attitudes and personality are as important as his skills or the particular methods of counseling which he

uses (3, 7, 9, 41). Some counselor educators (37) have even proposed that the education of the counselor should be a matter of personal development; thus, it would follow that a significant portion of counselor preparation programs should be concerned with improvement in attitudes and personality as well as with effectiveness and technique competence.

Characteristically, the practicum experience is chronologically placed in counselor education programs in order to integrate the theory and methodology which the prospective counselor has accumulated to that point. Obviously, practicum programs are intended to give the counselor-in-training real experience in counseling. However, some counselor educators feel that the practicum has far greater importance than its value as an integrative agent. Rather, the practicum may provide the most poignant opportunity for the counselor-in-training to experience understanding, growth, and change which is supposedly one of the major objectives of the theory and methodology portion of his training. This study explores the concepts of these kinds of changes.

Group procedures in counseling and guidance activities have long been recognized as an expedient alternative to individualized methods of counseling. The counselor's time is at a premium; group activities seem to be a better use of high-priced talent than individualized counseling. Just as there are advantages which accrue to a counselor who may choose to employ group techniques, so do there appear to be advantages to using group techniques in the professional training of counselors. Group experiences tend to bring about more rapid changes in the attitudes, personality, and self-concepts of counselors-in-training while teaching them how to use groups after they're out of training. Perhaps most important of all, the group experience may give a counselor-in-training an opportunity to look at himself as his future counselees will do and to make appropriate behavioral changes in the direction of his idealized professional self.

In order to prepare counselors for effective group work, counselor training agencies are including courses in group counseling techniques as required study. Significantly, diverse patterns of instruction of these group courses seems to be the rule. This study dealt with some of the significant questions which are raised as the result of such diverse techniques being employed in teaching group counseling.

It was anticipated that data gathered from this study would be useful in evaluating specific aspects (the practicum experience and the teaching of group counseling) of the counselor education program at NTSU. It was hoped that this study could be the beginning of an attempt to predict the attitudes, personality, and effectiveness of counselors who receive their training at NTSU. It also was anticipated that it would be useful in attempting to determine the extent to which a course in group

counseling techniques is effective in producing positive change toward desirable counselor characteristics in prospective counselors. It was further anticipated that the results of this study would be applicable to counselor education programs in similar universities.

Scope of the Study

This study was conducted at NTSU from the fall semester of 1968 through the summer session of 1970. Subjects for Part I of the study were all students who entered the counselor education program in the fall of 1968. Students entering the graduate program in elementary and secondary education in the fall of 1968 were used as a control group. Subjects for Part II of the study were counselors-in-training who were enrolled in the group counseling classes (and experimental subjects who were asked to postpone enrollment in that class and take another counseling class) from the spring semester of 1969 through the spring semester of 1970. This study examined specific aspects (practicum and the teaching of a course in group counseling) of the counselor education program at NTSU.

Research Terminology

The following research terminology will be defined as:

self-concept-- the feelings and attitudes which a person has about himself; that which gives the person a sense of identity and uniqueness.

self-image--- the individual's sense of who and what he is; the individual's view of himself as he sees himself.

social image-- the individual as others see him.

interpersonal relations--how the individual characteristically relates to other people; also how he wants to relate to others.

intensive group experience--an extended group experience of 16-18 hours (in a day and a half period) focusing upon greater awareness of self in the group setting.

Group counseling--counseling with more than two normal individuals which focuses on conscious thought and behavior and involves the therapy functions of permissiveness, orientation to reality, mutual trust, caring, understanding, acceptance, and support (22; p. 306).

Review of the Literature

The personality and attitudinal development of prospective counselors has received major emphasis in recent years. The need for prospective counselors to make positive improvements in attitudes and perceptions of self and others, as well as improvements in technical competence, has been recognized by counselor educators (6). Research has shown that counselor effectiveness is significantly influenced by the attitudes and personality of the counselor. Classic studies (18, 19, 41, 46, 47, 48) have indicated that the counselor's effectiveness is dependent upon more than his use of specific counseling techniques. The interpersonal factors which influence the way in which the counselor perceives his client and responds to him facilitate his effectiveness. It has been suggested that counselors who view themselves positively would be less threatened by the feelings of a client, and thus would be more free to understand and respond to him (7). Commonly identified attitudes and characteristics necessary for effective counseling relationships are: genuineness and warmth (49); empathetic understanding (41); open-mindedness (28, 42); interpersonal sensitivity (29); tolerance for ambiguity (12); positive and optimistic outlooks (53); and self- and other acceptance (25). Counselor education programs are attempting to provide experiences which will promote desirable changes in the personality, attitudes, effectiveness, self-concepts, and interpersonal functioning of prospective counselors. Group counseling is increasingly being used as a means of promoting self-awareness, better interpersonal relations, and personality and attitudinal development.

Research Related to Part I

A review of the pertinent literature in the area of counselor training indicates that the personal development of the prospective counselor is as important a part of his training as is the acquiring of techniques and methodology. There is general agreement among counselor educators that the practicum is one of the most critical aspects of the counselor training program, and most counselor educators expect prospective counselors to make changes in the area of personal development. A wide range of instruments have been used to measure changes in the personal qualities of counselors in training, and most of them have indicated areas of change. The following review of literature will be concerned with: personal development of prospective counselors; importance of the practicum; and measurement literature review.

Personal Development of Prospective Counselors

A number of major research studies (18, 19, 41, 46, 47, 48) have

presented evidence indicating that crucial factors of a counselor's effectiveness are not his use of a particular technique or his adherence to a specific theory. It seems that effective counseling relationships are more dependent upon the nature of the counselor's attitudes and his ways of perceiving himself, his client, and his goals. Self- and other-acceptance, empathic understanding, and interpersonal sensitivity have been frequently identified as attitudes and characteristics which are necessary in a therapeutic relationship.

Hurst and Jensen (25) state that in spite of the general acceptance of the foregoing attitudes and characteristics as crucial to effective counseling, such qualities are almost universally ignored in the formal requirements of counselor education programs. While much is said to the prospective counselors about the importance of developing acceptance, warmth, and sensitivity, little seems to be done within formal programs to help students develop these qualities in their own personalities. Hurst and Jensen feel that the importance of these qualities is recognized by counselor educators but that there are no tested and accepted procedures for bringing about their development. In their own study which was designed to evaluate a procedure for facilitating the personal growth of prospective counselors, Hurst and Jensen found that personal growth in terms of self- and other-acceptance will not occur in prospective counselors involved in programs that do not make a direct attempt to bring it about. Their study indicated that on the personal growth variables measured there was no significant difference between a theory-methodology training procedure and no training at all.

There are strong indications that counselor effectiveness is influenced by personal or non-intellective qualities (26). LeMay (29) holds that the nature of the relationship a counselor establishes is probably closely related to the fundamental attitudes he brings into the counseling situation and concludes that the possession and further development of certain attitudes toward self and others is basic to the development process of counselor education. This is in agreement with other educators (30, 37, 40, 50) who hold that the self of the counselor--his personality and his attitudes--is reflected in the counseling process.

The American Personnel and Guidance Association (2) has emphasized the importance of personal growth in counselor training programs through its recognition of the significance of skills other than professional and academic and by its recommendation that selection criteria be applied to personal qualities of prospective counselors.

There would seem to be no way to escape the conclusion that the counselor himself is the most important tool in the counseling process and that his attitudes and personality, as well as his effectiveness, must be critically measured and assessed (7). That the counselor's

training can reflect attitudinal and personality changes in addition to increased gains in theoretical and conceptual material has been demonstrated by studies (33, 38).

Importance of the Practicum

The one element of counselor training programs which has received the most attention from counselor educators and professional organizations is the practicum. The American Psychological Association, Division of Counseling, says: "The practicum is in some respects the most important phase of the whole process of training in counseling." (3, p. 189). There seems to be agreement that practicums should provide an opportunity for the prospective counselor to integrate previous theory and methodology with actual practice in a supervised setting in which he has an opportunity to grow personally as well as professionally (2).

The Association for Counselor Education and Supervision (8) has recommended that increased emphasis be placed upon the practicum experiences of prospective counselors. Research has shown that practicum counselors' behavior in counseling relationships has tended to change in directions prescribed by the perceptual orientation of "good" counselors (23).

Personal characteristics of counselor trainees and their counseling behavior during the practicum experience have been examined (26, 43). These studies have shown that desirable personality changes and more effective counseling behavior have occurred during the practicum training.

Measurement Literature Review

Although there seems to be general agreement among counselor educators concerning the development of desirable personal growth characteristics as a major aspect of prospective counselors' training, few instruments have been devised to successfully measure personality, attitudes, and effectiveness (45). Thus, the need to make further studies to determine the most effective means of measuring these characteristics becomes apparent.

Rokeach Dogmatism Scale

The Rokeach Dogmatism Scale (RDS, Form E) is often used in studies measuring attitudinal changes in counselors. This scale measures open-mindedness versus closed-mindedness or dogmatism and characterizes persons possessing open-mindedness as having a greater ability to act on the bases of information received and internal self-actualizing forces

rather than irrational inner forces.

The RDS has been used to investigate the relationship between dogmatism and teaching experience in counselor trainees (62). Results indicated that counselor trainees with teaching experience are significantly more dogmatic. The question of the advisability of selecting counselor trainees with teaching experience was raised. The suggestion was also made that the RDS could be used as part of a selection battery for screening prospective counselors.

DeRoo (16) used the RDS to study the relationships between the counselor trainee's personality and his counseling behavior and found a significant relationship between changes in the dogmatism scores and changes in counseling behavior. Allen (1) examined the relationships between psychological openness and effectiveness of counselor trainees using the RDS and a number of other instruments. The results of his study suggest that the effective counselor is one who is on relatively good terms with his own emotional experiences and that the ineffective counselor is one who is relatively uneasy in regard to the character of his inner life.

In using the RDS, Charnofsky (13) found that, as a group, the prospective counselors studied did not become significantly less authoritarian or rigid. Another study (36) used the RDS to measure the level of open-mindedness of prospective counselors and found no reliable relationships between open-mindedness and levels of empathic sensitivity offered to practicum clients or to filmed clients.

Test of Counselor Attitudes

Porter's Test of Counselor Attitudes (TCA) has been the most frequently used instrument in investigating counselor attitudes. It measures five categories of counselor attitudes: Understanding, Supportive, Probing, Interpretative, and Evaluative. Most studies have found significant changes in at least some of the five sub-scales.

The TCA was used by Munger and Johnson (33) to investigate changes in attitudes during counselor training. Significant changes in all five of the categories of the TCA were found. Demos and Zuwayleif (15) also used the TCA to study changes in counselor attitudes during counselor training. Significant differences were found for all five categories of the test.

Significant improvement (38) on all attitudinal categories of the TCA were found by Rochester (38) in a study of counselors in training in eight academic year-long NDEA Counseling and Guidance Institutes. Results

of this study indicated that counselor trainees with no prior experience or part-time experience made significant changes while trainees with full-time counseling background did not change significantly. However, a later study by Rochester (39) indicated that the attitudinal changes were not completely permanent.

Using the TCA, Kassera (27) found that a summer session NDEA Institute brought about significantly greater changes on the Evaluative, Supporting, Probing, and Understanding scales of this measure than did a regular counselor education program.

Kemp (28) has used the RDS and the TCA to study the relationship between open- and closed-mindedness and the character of counselor responses in hypothetical and real life situations. He says that his study indicates that without specific training, neither those with an open or closed belief system change significantly. He says that efforts should be directed toward the creation of a climate or relationship which will leave the counselor trainee free to analyze, evaluate, accept, or discard his evolving conclusions concerning principles and methods. His study indicates that more emphasis should be placed on assisting the counselor trainee to understand his own personality dynamics since his counseling will be in agreement with his inner attitudes. It also indicates that sufficient experience should be provided in simulated "cases" to aid him not only in improving in technique but in discovering to a greater degree his genotypical attitudes--the form of responses which coincide with his approach to life.

Personality Measures

Wrightsman (53) has made a number of studies of attitudinal changes of counselors in NDEA Institutes using the RDS and the Philosophies of Human Nature Scale (PHN). He has found that counselors who believe that people are rational and are able to determine their own outcome in life (as measured by the PHN) are seen as possessing more warmth, are well liked, and are more often chosen for one's own counselor. He also has found that counselors who possess dogmatic, closed-minded attitudes (as measured by the RDS) are seen as less intelligent and less skilled counselors. His studies have shown that counselors have extremely favorable views of human nature.

An unpublished study of an NDEA Guidance and Counseling Institute at North Texas State University (4) indicated that the counselors, as a group, were highly self-actualized as measured by the Personal Orientation Inventory. Individual counselors who made significantly lower scores (indicating less self-actualization) on various scales of the POI also made lower sociometric scores when rated by their peers. It may

be significant to note that these individuals were either experienced teachers or counselors who were anticipating being employed in counseling positions following their training experience.

Summary of Research Related to Part I

There seems to be agreement among counselor educators that the prospective counselor's training experiences should produce desirable changes in his attitudes, personality, and effectiveness and that the practicum experience should contribute heavily in that direction also. Most of the studies do show that changes in these characteristics are produced, especially as a result of the practicum. How well the total training program contributes to these kinds of changes has not been definitely established. The present study looks at this facet of the counselor's training.

Research Related to Part II

Opportunities for prospective counselors to be participants in group counseling situations and to learn the techniques involved in group counseling are increasingly being provided in counselor education programs. This area is one of the newest additions to most counseling programs, and its inclusion is based upon a belief that counselor trainees can make constructive changes in their attitudes, personality traits, and interpersonal relations. It is also felt that the counselor trainees can learn how to be better individual and group counselors by observing an experienced counselor at work and by experiencing the feelings that clients have in a counseling session. If counselors are to accept themselves as well as their clients, they must possess self-understanding. McKinnon (32) suggests that the counselor trainee needs to be involved in counseling so that he can understand himself better, and he suggests group counseling as an effective means of bringing about desirable changes in self-understanding and interpersonal relations and as a means of training more effective individual and group counselors. The following review of the literature will be concerned with: personal development of prospective counselors; use of group counseling as a technique in training counselors; and other training uses of group counseling.

Personal Development of Prospective Counselors

The counselor's understanding of himself and his interpersonal relations influences his effectiveness in his counseling relationships (40, 41). Rogers (14, p. 645) says that each individual needs positive

regard--acceptance, liking, warmth, empathy, and respect--from other people who are important to him. The individual is able to accept himself and feels free to be himself because of this positive regard. The individual's need to be defensive and to conceal his true feelings is also reduced by this positive regard. According to Rogers, when the individual accepts himself, he tends to develop feelings of positive regard for others; this feeling, in turn, facilitates the communication of real feelings and the development of a healthy and satisfying relationship.

Use of Group Counseling as a Technique in Training Counselors

Much of the definitive investigations of the use of group counseling as a means of training counselors has been done by Gazda and Ohlsen (20). They found that prospective counselors in an experimental group which participated in a group counseling experience made some significant personality changes which were not observed in the control group. They did note that the experimental group appeared less healthy at the termination of group counseling than it had at the beginning. However, a follow-up study found an increase in the direction of improved mental health exhibited by the experimental group. The authors suggest that the seven weeks' experimental period was probably too short for effective group counseling and that results from group counseling might be more detectable after a longer period of time. The present study lends support to Gazda and Ohlsen's findings. It would seem (as indicated by the data from the present study) that changes made during short, summer sessions are not as pronounced as those made during the fall-spring semesters.

Bonney and Gazda (11) have studied the use of group counseling as a means of increasing prospective counselors' self-understanding. Their results indicate that the prospective counselors felt that the group counseling experience helped them understand how they perceived others and how they were perceived and that it changed their self-concepts and also improved their relations with colleagues and clients. Least affected by the group counseling experience were the prospective counselors' concepts of social reality and their value systems. However, Bonney and Gazda point out that with mature, presumably well functioning adults, one would expect these to be least affected by the experience. The participants in Bonney and Gazda's study unanimously recommended that participation in group counseling should be a part of the counselor training program.

A study by Betz (10) revealed that prospective counselors who participated in affective counseling experiences (focusing primarily on interpersonal group relationships) significantly modified their counseling

behavior. The group which received cognitive group counseling (focusing primarily on content rather than feelings and encouraging the examination of group experiences on an intellectual level) did not demonstrate this significant difference.

A follow-up study (21) of counselors who received short-term group counseling as a part of their training program indicated that the majority of the participants were happier individuals as a result of the group counseling experience. In another study by Gazda and others (22), a significant increase in the prospective counselors behavior in the group was noted. The participants became more informing, more interpretative, more aggressive, and less participative. These results seem to indicate that the group members became less inhibited, more self-confident, more aware of self, more involved in helping other people in the group, and more able to remain silent in the group when they had resolved their problems.

Placing the prospective counselor in a group with an experienced counselor and giving him a group to lead under the supervision of an experienced counselor seems to be the most effective way to provide opportunities for prospective counselors to make personality changes and to train them for group counseling (5). In this kind of arrangement, the prospective group leader (counselor) participates in a group, observes an experienced leader, and utilizes his knowledge and gains experience by leading a group.

A number of studies have attempted to evaluate the use of group counseling in producing desirable changes in prospective counselors' personality, self-concepts, and effectiveness. Padgett (35) found that subjects who experienced group counseling made significant changes on Identity scores on the Tennessee Self-Concept Scale. In an attempt to determine if group counseling would increase prospective counselors' self-concepts, Wirt, Betz, and Engle (51) found that the group which received group counseling made no significantly greater change in self-concept than did the group which received no group counseling.

Other Training Uses of Group Counseling

In a study of the use of group counseling as an adjunct to the practicum, McKinnon (31) concluded that counselor trainees' responses and perceptual gains are not greatly different regardless of exposure to group counseling or practicum, or a combination of group counseling and a practicum.

Group counseling has been used as a means of training marriage counselors and family life educators (34). Increased capacities to

experience feelings of jealousy, love, fear, and hate were reported gains made by marriage counselors who experienced group counseling as a part of their training. These counselors also felt that they had gained more self-awareness after the experience.

Foreman (19) used T-Group experiences modeled after the National Training Laboratory program to increase sensitivity toward the feelings of others and to improve communications among counselor educators and prospective counselors. Fifty-four hours of group sessions spread over two consecutive week-ends were used. A follow-up survey indicated that the counselor educators felt that their staff relationships had been improved, and they felt that the counselor trainees would be better counselors because of the T-Group experience. Improvement in inter-personal relationships was the major change which the counselor trainees felt had occurred.

In a study utilizing the T-Group approach to improve the effectiveness of counselor trainees, Seegars and McDonald (44) found that the participants became more perceptive of other participants' behavior. The participants in this group were unanimously in favor of providing T-Group experiences for all counselor trainees.

Summary of Research Related to Part II

The practice of having prospective counselors participate in group counseling as a means of fostering their personal development and as a means of training them to lead groups is finding wide acceptance. Generally it has been found that favorable changes in the prospective counselors' perceptions of others, their self-concepts, and their effectiveness have occurred as a result of the group counseling experiences.

The present study has examined the effect of a course in group counseling techniques on prospective counselors and has made comparisons using time variables as well as specific methods. It seems to have attempted to examine group counseling courses from a much larger perspective than most of the studies cited in the above review of literature.

Methodology and Design

As previously indicated, this study consisted of two parts. The first part examined the relative amounts of change on selected criterion measures from the beginning of the counselor training program to (a) the beginning of the practicum experience, and (b) the end of the practicum experience. The criterion measures, which were concerned primarily with changes in attitudes, personality, and rating of effectiveness,

allowed estimates to be made about the relative effectiveness of two gross parts of the counselor training program in bringing about changes in the trainees. Part II of the study examined the relative effects of various treatments on selected criterion measures. The treatments of primary concern were the presence or absence of group process experiences in the training program. The criterion measures consisted of differences between pre- and post-test scores (post- minus pre-) on attitude, personality, and self-concept measures.

The design and analysis for these two parts of the study will be described separately, in detail. The results will be similarly treated.

PART I

Nature of the Sample

All of the prospective counselors who officially entered the graduate program in counseling at North Texas State University in the fall of 1968 were selected as an experimental group in Part I of the study. There were fifty-three subjects in the experimental group, and a control group of sixty-two graduate-level education majors from NTSU, who began their work in June, 1969, was established. The control subjects were all of the students officially entering the graduate education program (secondary and elementary education) at that time. Officially entering a graduate Education program at NTSU is marked by enrollment in Education 571, a "core" course, as well as expressed intention to work toward a graduate degree. This distinction enabled the researcher to discriminate between true degree-seeking students and the usually large number of "course takers" in graduate Education departments. Both the experimental and control group thus have greater homogeneity with respect to educational and career aspirations. Both of these groups, since they consisted of all such students available, at the time they were selected, are conceptualized as a "sample" of such groups that might have been selected at other points in time.

As the deadline for finishing the study approached, only twenty-seven experimental subjects and thirty-five control subjects had finished the training program. An examination of students who had not finished their programs indicated that all were achieving adequately and were capable of and intended to finish (some anticipating completion of the program as far away as 1975). The lesser proportion of counselors finishing is explained by: (1) the somewhat longer time required to finish the program (due to the practicum and clinical experiences) and, (2) the fact that most of the graduate students are employed in schools or colleges where counselors typically work more than nine months, thus allowing less time for summer studies.

It is assumed that no differential bias was introduced by these differential attrition rates for experimental and control groups, since they are easily explained natural phenomena for the students involved and do not relate to final completion rates for the programs themselves. For hypotheses involving only the experimental group, no differential bias is introduced since only inter-group comparisons are made (hypotheses 1-4, sub-hypotheses c, and hypothesis 5).

Data Collection

The experimental group was tested at three points in time: (a) at the beginning of the counselor training program (second week of semester enrolled in Education 571); (b) at the end of the course work portion of the program but before the counseling practicum (second day of practicum); (c) at the end of the counseling practicum (last week of semester and last week of graduate program). The experimental subjects were tested with the following instruments at all three points in time: Rokeach Dogmatism Scale (RDS), Philosophies of Human Nature Scale (PHN), Test of Counselor Attitudes (TCA), and the Personal Orientation Inventory (POI). They were also rated by their practicum supervisors at points b and c, using the Counselor Rating Blank (CRB).

The control subjects were tested at points a and b using the RDS, PHN, TCA, and POI. The control group was not retested at time c since they did not undergo any consistent treatment change at time b, whereas the experimental group changed from the course work phase of their program to the practicum phase of their program. In fact, the control group experienced neither of the experimental treatments. The control group was included only to detect any "natural" changes that might occur on the selected measures over a period of time in the absence of any treatment. This insured against the possibility of incorrectly attributing such change to one of the experimental treatments.

All testing was conducted in groups during class time by professional personnel at NTSU. Test results were then supplied to the researcher.

Instrumentation Rationale

The Rokeach Dogmatism Scale (RDS) measures dogmatism along a continuum which runs from an open belief system to a closed belief system. Form E was used in this study. Reliabilities on the various forms of this scale range from .70 to .93. Rokeach's work has been primarily concerned with the construct validity of the scale. Kemp's (28) studies also are favorable to the construct validity of this instrument.

The Philosophies of Human Nature Scale (PHN), which was devised by Lawrence Wrightsman, attempts to measure a person's beliefs about human nature. The interpersonal aspects of human nature are the main focus of this scale. The six dimensions of human nature which this scale measures include: Trustworthiness, Altruism, Independence, Strength of Will, Complexity, and Variability. The first four sub-scales can be summed to give a general Favorableness of Human Nature score, and the last two sub-scales can be summed to give a score on the Multiplexity of Human Nature.

Some of Wrightsman's (53) research which has been concerned with the reliability of his instrument has shown that with groups of undergraduates, the reliability coefficients for the individual sub-scales range from .60 to .92 with nine of the twelve coefficients being above .70. Although the reliability coefficients for the graduate students in this study were lower, ranging from .40 to .75, Wrightsman points out that this is due to the homogeneity of the attitudes of the graduate students. Wrightsman's studies have demonstrated the construct validity of the scale. He says that predictions relating the scale to sex differences, self-ideal discrepancies, differences in religious background, evaluations of one's instructor, and comparisons between the PHN and other measures have been borne out.

Porter's Test of Counselor Attitudes (TCA; revised by Hopke, 1955) measures attitudes in five areas: Evaluative Responses, Supportive Responses, Interpretive Responses, Understanding Responses, and Probing Responses. In 1955, Hopke conducted a study on the reliability and validity of this instrument and also revised it. This revised instrument was used in this study. Hopke (24) found reliability coefficients which ranged from .46 to .85 with sixteen of the twenty coefficients being above .60. When Hopke correlated this scale with other measures, he found that with the exception of two supervisors' ratings, all correlations with the test were .60 or higher.

The Personal Orientation Inventory (POI) is based on Maslow's theory of the self-actualizing person--the person who is more fully functioning and lives a more enriched life than the average person. The test has twelve sub-scales which include: Time, Support, Self-actualizing Value, Existentiality, Feeling Reactivity, Spontaneity, Self-regard, Self-acceptance, Nature of Man, Synergy, Acceptance of Aggression, and Capacity for Intimate Contact. Using the test-retest method, reliability coefficients of .93 for the Support Ratio score and .91 for the Time Ratio score have been found. In validity study, the test was administered to two groups of "relatively self-actualized" and "relatively non-self-actualized" adults, and it was found that the scale significantly discriminates between clinically judged self-actualized and non-self-actualized groups on eleven of the twelve scales measured.

The Counselor Rating Blank (CRB) is a rating scale which categorizes and rates certain characteristics of perceived counselor behavior. The categories include: (1) an overall rating of competence, (2) flexibility in the counseling situation, and (3) response to supervision. Because rating of counseling behavior involves an inferential and evaluative process by the supervisor, this scale provides examples of specific behaviors for each sub-scale to focus the rating process on less subjective factors. In the initial study with this instrument, the supervisors' ratings were analyzed for an estimate of internal consistency. Rank order coefficients ranging from .91 to .95 were obtained.

Hypotheses

Given the three points in time at which data were collected, the following criterion scores were computed for the tests administered. Change I is equal to score at point b minus score at point a. Change II is equal to score at point c minus score for point b. These change scores therefore measure the amount of "change" (personality growth, attitudinal change, effectiveness as a counselor, etc.) on the selected tests, during the two major phases of the counselor training program (course work, theoretical studies, etc., versus practicum experience). These criteria then allow the following hypotheses to be tested ($\alpha = .05$):

1. On the Rokeach Dogmatism Scale:

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

2. On the various sub-scales of the Philosophies of Human Nature Scale:

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

3. On the various sub-scales of the Test of Counselor Attitudes:
 - (a) Change I in the experimental group will not differ significantly from Change I in the control group;
 - (b) Change II in the experimental group will not differ significantly from Change I in the control group;
 - (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.
4. On the various sub-scales of the Personal Orientation Inventory:
 - (a) Change I in the experimental group will not differ significantly from Change I in the control group;
 - (b) Change II in the experimental group will not differ significantly from Change I in the control group;
 - (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.
5. On the Counselor Rating Blank, the pre-test scores will not differ significantly from the mean post-test scores. Only the experimental group is rated on this instrument at points b and c (at the beginning of the practicum and at the end of the practicum).

Analysis of Data

Parts (a) and (b) of hypotheses 1 through 4 were tested by a process equivalent to a two-group analysis of covariance, using the appropriate pre-test score (point a for Change I and point b for Change II) as a concomitant variable, thus controlling statistically for variance due to differential "starting points" on the tests for the subjects. Unlike the traditional analysis of covariance, however, the assumption of equal relationships between criterion and concomitant variable for the two groups was actually tested, before proceeding to the test of group differences. The details of this procedure are explained in Appendix A.

Part (c) of hypotheses 1 through 4 and hypothesis 5 were tested using the t ratio for mean differences in two groups with correlated scores. (Popham, 1967).

$$t = \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{\frac{s_1^2 + s_2^2 - 2r}{n}}}$$

PART II

Nature of the Sample

The sample of subjects used in this part of the study is identified in Figure 3-1, page 24. The pool from which the experimental and control groups were selected consisted of all of the graduate majors in counseling and guidance who reached the point in their program where they intended to enroll in the course in group counseling methods. Subjects' placement in a particular experimental treatment was determined by their enrollment in the group counseling class for a particular semester. Assignment of instructors to a particular treatment was random with rotation being used so that no one instructor dealt only with one treatment. Control subjects were selected by randomly identifying and asking prospective enrollees in the group counseling course (who would normally have taken the group counseling course in a particular semester) to postpone enrollment for at least one semester and to enroll in another course in the counseling program during the study time. This was accomplished during registration each semester. Some students, who originally were placed in the control group for a particular semester, later enrolled in the group counseling course during the study period. These continued to be "control" students and their data were not included in the experimental group. I.e., students appeared only in one of the groups--not both. The numbers in parentheses identify the cells of the figure. References to these cell numbers will be made in Appendix B.

Pre- and post-test data were obtained on 150 experimental subjects. Only 104 of these were used as subjects in the study; 46 were eliminated because they were enrolled in classes with an instructor who left North Texas State University after two semesters. It was felt that it would be better to use only subjects who experienced treatments from the same pool of instructors. The control groups consisted of 11 summer students and 24 fall-spring students. (See Figure 3-1 for distribution of numbers.)

Figure 3-1

Distribution of Subjects in Part II of the Study

Time	Experimental Groups L_1				Control Groups L_2, C_2, I_2
	C_1		C_2		
	I_1	I_2	I_1	I_2	
T_1	15 ₍₁₎	14 ₍₂₎	16 ₍₃₎	15 ₍₄₎	11 ₍₉₎
T_2	36 ₍₅₎	14 ₍₆₎	24 ₍₇₎	30 ₍₈₎	24 ₍₁₀₎

Description of Treatment

Treatment L_1 consists of the regular lecture-group instruction. Treatment C_1 requires the participants to conduct group sessions acting as group leaders. Treatment I_1 consists of an intensive group membership experience at the beginning of a semester. Treatment levels L_2 , C_2 , and I_2 represent the absence of the respective "one" level. T_1 refers to summer session enrollments and T_2 refers to regular fall-spring semester enrollments.

Definitions of Treatments:

- L_1 ---Lecture-group instruction. In this treatment, the subjects attended approximately 54 classroom hours, half of which consisted of instruction in theories and methods of group procedures, and half of which consisted of participation in an actual group experience (led by the class instructor). Students were required to read articles and research related to group processes, write critical papers on group processes, and keep journals of their own group experiences.
- C_1 ---Subjects conducted groups acting as group leaders. In this treatment, the subjects spent approximately 36 hours outside their classroom experiences conducting groups of their own. The subjects were required to organize their own groups of high school students, college students, or adults who wished to participate in a group experience. The instructors in the group courses supervised the subjects' group leadership activities.
- I_1 ---Intensive group experience. In this treatment, the subjects participated in an extended group experience of 16-18 hours

(in a day and a half period) focusing upon greater awareness of self in a group setting. The intensive group experiences were conducted at the beginning of a semester and were held in settings outside the campus (instructors' homes, retreat areas, etc.). These groups were conducted by the class instructors who were also experienced group leaders.

Data Collection

Pre-tests were administered at the beginning of the group counseling course. Post-tests were administered at the end of the course. The instructors in the group counseling courses (for the experimental subjects) and the instructors of the control subjects (who were asked to postpone taking the group course) rated their students.

From each instrument criterion scores were computed by subtracting the pre-test score from the post-test score, thus indicating the amount of change occurring during the experiment. As indicated in the following description of the analysis of the data, the pre-test scores were retained as concomitant variables to control for initial differences among subjects.

Instrumentation Rationale

The following instruments were administered twice (points a and c; at the beginning of the graduate program and at the end of it) to all subjects, experimental and control: FIRO-B, Tennessee Self-Concept Scale, and the Self-Concept Scale. The Counselor Rating Blank was given only to counselors at all three (a, b, and c) testing points. The experimental group was also tested with all instruments at point b (beginning of the practicum).

The Tennessee Self-Concept Scale (TSCS) provides a comprehensive measure of self-concept. The scale consists of one hundred Likert-type self descriptive statements which the subject uses to portray his own picture of himself. The scale is self-administering for individuals and for groups, and it has a sixth-grade reading level. The scale is applicable to the whole range of psychological adjustment from healthy, well-adjusted people to psychotic patients. The Counseling Form of the Scale was used for this research project, and the score used was the Total Positive Score to get an overall picture of the individual's self-concept.

Test-retest reliability for the Total Positive Score is .89. The standardization group from which the norms were developed was a broad sample of 636 people of different ages and intellectual abilities from all over the country. The norms were over-represented in the number of

college students, white subjects, and in persons in the twelve to thirty age bracket.

The TSCS does meaningfully discriminate psychotic from normals and different psychiatric groups from one another. It correlates well with the Minnesota Multiphasic Personality Inventory and the Edward's Personal Preference Scale. Studies (35, 51) have shown that the TSCS can measure change that occurs through group counseling.

Another instrument used to measure change was the Fundamental Interpersonal Relations Orientation—Behavior Scale or FIRO-B developed by William C. Schutz. This scale is based on the assumption that there are three basic interpersonal needs, and these are sufficient to account for interpersonal behavior. The needs proposed are control, affection, and inclusion. Control is the need to establish and maintain a satisfactory relationship with respect to authority and power. Affection is defined as the need to establish and maintain satisfactory relations with others with regard to love and affection. Inclusion is defined as the need to establish and maintain a satisfactory relationship with people with respect to interaction and association.

The scale furnishes six scores which include Expressed Inclusion, Wanted Inclusion, Expressed Control, Wanted Control, Expressed Affection and Wanted Affection. This scale is a cumulative Guttman-type scale, and it consists of fifty-four items. Split-half reliability on the FIRO-B is reported at .94 and test-retest reliability ranges from .71 to .82.

The Self-Image Questionnaire (SIQ) is a scaled questionnaire which allows subjects to respond in regard to the way in which they see themselves on such traits as cautious or adventurous. To obtain the individual's social images, others rate him as they see him. The individual also rates himself as he thinks others see him to obtain the Others image.

Hypotheses

The hypotheses are ($\alpha = .05$):

1. There are no significant differences in criterion scores (post-test minus pre-test) between levels of treatments (a) L_1 and L_2 , (b) C_1 and C_2 , (c) I_1 and I_2 , (d) T_1 and T_2 , for students with the same scores on the concomitant variables (pre-test scores).
2. Any criterion score differences between treatment levels for any independent variable (L, C, I, or T) do not differ significantly between the treatment levels of any of the other three independent

variables with which it exists in combination.

Analysis of the Data

Hypothesis one is equivalent to a two-group analysis of covariance. Hypothesis two examines the possible two-way interactions among treatments with covariates. If any of these yield significant results, qualifications must then be made for hypothesis one.

Appendix B may be consulted for a more detailed description of the analyses.

Results of the Analysis

Following the format in previous sections, the results of the analyses will be reported separately for Part I and Part II of the study.

Part I

In Table 4-1 (pp. 28-29), descriptive statistics for the original tests used in this part of the study and the change variables computed from these tests (for testing the hypotheses) are reported. This is done separately for the experimental group and the control group. No particular comments need be made concerning these data, but they do indicate that the control group test scores, at time a and b, are basically the same as the experimental group test scores at time a and b, respectively. It is also noticeable that the Change II scores (time c - time b) for the experimental group are generally in the same direction as the Change I (time b - time a) variables and of generally slightly greater magnitude. This would indicate that slightly greater amounts of change occurred during the practicum period than the course work period of the counselor training program. Since sub-hypotheses c of hypotheses 1-4 are concerned directly with this statistic, this will be treated later in the section.

Tables 4-2 and 4-4 (pages 31 and 49) present the F ratios associated with the primary statistical test, degrees of freedom, and indicate the level at which the F ratio would be significant. As explained in Appendices A and B, the hypotheses were tested by comparing a full and restricted regression equation. The restricted regression model in each case expressed the null hypothesis being tested, in terms of restrictions being placed on the coefficients of the full model. The squared multiple correlation coefficients are reported for each test in these tables. These are of little value in themselves but do give some indication of the total amount of variance on the criterion variable which can be accounted for

Table 4-1

Means and Standard Deviations of Tests and Change Variables
for Experimental and Control Groups, Part 1 of Study

Experimental Group, N = 27

Variables	Time A		Time B		Time C		Change 1		Change 2	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
RDS	136.1	27.5	134.3	27.4	130.9	31.4	-1.8	8.1	-3.4	11.1
TCA #1	76.1	9.8	76.0	9.5	76.7	9.4	-0.1	2.5	0.7	6.2
#2	61.1	7.3	61.1	6.5	62.8	7.5	0.0	2.9	1.6	6.6
#3	68.1	6.8	68.7	6.7	70.0	8.1	0.6	2.2	1.3	5.8
#4	57.1	10.5	56.4	9.1	55.3	7.7	-0.6	3.0	-1.1	6.1
#5	37.7	13.4	37.7	12.7	39.5	13.9	0.1	3.9	1.8	7.5
POI #1	41.4	13.4	40.4	12.8	38.3	13.0	-1.0	2.0	-2.0	4.5
#2	76.6	20.4	77.9	20.2	81.2	20.5	1.3	2.1	3.3	3.7
#3	21.3	9.4	21.4	8.9	21.4	6.6	0.1	1.2	0.0	3.5
#4	20.5	8.8	21.3	9.2	23.3	11.0	0.7	1.3	2.0	3.0
#5	15.4	4.2	16.0	3.2	17.2	3.6	0.6	1.8	1.2	3.0
#6	11.3	3.2	11.5	2.5	13.9	3.1	0.3	1.6	2.3	2.3
#7	12.8	2.5	12.9	2.6	15.0	3.3	0.0	1.6	2.1	2.3
#8	15.1	3.2	15.4	3.2	17.0	3.7	0.2	1.3	1.6	2.0
#9	12.8	2.2	12.9	2.1	14.4	3.2	0.1	1.7	1.6	2.8
#10	7.6	2.4	10.3	1.5	15.4	3.0	2.7	1.8	5.1	2.7
#11	14.0	3.4	11.7	3.0	9.4	3.5	-2.3	1.6	-2.3	4.0
#12	16.6	3.5	16.7	3.3	17.8	4.0	0.1	1.4	1.1	2.8
P of HN #1	36.0	12.2	35.7	11.7	34.0	12.9	-0.3	3.9	-1.7	9.2
#2	34.5	11.6	33.7	10.6	32.2	11.8	-0.8	3.7	-1.5	6.0
#3	28.4	12.7	29.1	11.0	31.7	12.1	0.7	4.0	2.6	9.3
#4	23.3	11.7	24.6	11.2	28.6	14.0	1.4	4.1	4.0	6.9
#5	29.5	9.6	27.1	10.2	26.8	11.3	-2.3	7.0	-0.4	12.1
#6	29.7	11.4	28.3	11.1	30.0	10.9	-1.5	8.2	1.7	11.8
CRB	*	*	23.2	2.6	29.2	3.8	*	*	6.0	2.5

* data not collected or computed.

Table 4-1

Means and Standard Deviations of Tests and Change Variables
for Experimental and Control Groups, Part 1 of Study

Control Group, N = 35

Variables	Time A		Time B		Change 1	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
RDS	130.6	19.1	126.7	18.5	-3.9	6.6
TCA #1	77.5	8.7	79.1	5.7	1.6	1.7
#2	64.9	8.2	65.1	9.0	0.2	3.9
#3	67.8	6.4	70.5	7.0	2.7	2.1
#4	63.7	9.0	64.4	10.4	0.7	3.1
#5	51.5	18.1	52.9	18.9	1.4	4.9
POI #1	37.2	12.6	34.5	11.0	-2.7	1.8
#2	88.7	10.4	88.6	11.1	-0.1	1.2
#3	20.7	2.7	20.8	2.4	0.1	0.9
#4	22.1	5.1	22.3	4.7	0.2	1.1
#5	15.0	2.3	15.7	2.6	0.7	1.3
#6	11.9	3.1	12.2	2.7	0.3	1.2
#7	13.3	2.1	13.4	2.0	0.1	1.4
#8	16.8	2.6	17.0	2.9	0.2	1.2
#9	13.6	1.8	13.2	1.6	-0.4	1.0
#10	14.8	2.9	15.3	2.5	0.5	2.2
#11	8.1	1.8	8.2	1.7	0.1	1.0
#12	18.3	3.0	18.1	3.2	-0.2	1.3
P of HN #1	32.1	12.3	32.3	9.1	0.1	3.5
#2	31.8	9.7	33.1	8.0	1.3	3.1
#3	28.6	11.1	28.6	10.0	0.0	3.4
#4	25.1	9.5	25.6	9.4	0.5	3.9
#5	33.4	9.5	32.8	7.8	-0.6	6.0
#6	35.7	13.5	35.9	10.7	0.2	6.5

CRB *

* CRB is not presented in tabular form at this time due to its failure to be administered to a control group.

by the predictor variables. It will be noticed that in some cases, quite a large proportion of the criterion variance can be accounted for in terms of the treatments and concomitant variables.

The adjusted differences reported in Tables 4-2 and 4-4 (pages 31-33 and 49) and the adjusted cell means in Figures 4-14 through 4-16 (pages 57, 58 and 59) are intended only to reflect the expected differences between groups when the concomitant variables are held constant statistically. Another way of stating this is that the adjusted differences or means (which in turn reflect differences) indicate group differences that would be expected if the members of the groups all had the same scores on all of the included concomitant variables. Graphically, this would be represented as the vertical distance between parallel regression lines for the groups of interest.

Table 4-2 (page 31) reports relevant statistics for hypotheses 1-4, presented separately for sub-hypotheses a, b, and c. The first hypothesis compared the change score for the control group with the first and second change scores for the experimental group and also compared the two change scores for the experimental group, on the Rokeach Dogmatism Scale (RDS). As indicated in the table, no significant differences were observed.

Hypothesis 2 compared the change score for the control group with the first and second change scores for the experimental group and also compared the two change scores for the experimental group for each of the six sub-scales of the Philosophies of Human Nature Scale (PHN). As indicated in "Methodology and Design" and Appendix A, the relationship between the criterion variables (change scores) and each concomitant variable (the appropriate pre-test score for the change score) was examined separately for the experimental and control groups. Unless these relationships are the same for the two groups, it is not generally appropriate to test for a single group difference, since the difference between the groups would vary according to the level of the concomitant variable. With reference to sub-hypothesis a, it was found that the relationships could not be considered equal, at the .05 level of significance, for the Trustworthiness sub-scale of the PHN. This is indicated graphically in Figure 4-1 (p. 35), which shows separately the regression lines representing the relationship between the Trustworthiness scale of the PHN pre-test at time a, and the Change I criterion scores for the experimental and control groups. This figure indicates that a greater amount of positive change can be expected for students exposed to the control treatment than the experimental treatment if they have lower test scores on the Trustworthiness scale of the PHN at the beginning of the program. Similarly, a greater amount of negative change is expected of students exposed to the control treatment as opposed to the experimental treatment, if initial scores on the Trustworthiness scale of the PHN are

Table 4-2

Tests of Hypotheses 1, 2, 3, and 4, Part 1 of Study

Sub-hypotheses A
Change 1 Experimental vs. Change 1 Control

Hypotheses and Variables		F ratio df=1/59	R ² full model	R ² restricted model	Adjusted difference (experimental-control)	
HO:1 RDS		1.55	.06	.04	2.52	
HO:3 {	TCA #1	4.61 *	.34	.29	-2.15	***
	#2	.46	.06	.05	- .75	
	#3	4.63 *	.11	.04	-2.17	
	#4	3.14	.05	.01	-1.60	***
	#5	1.99	.03	.00	-1.54	
HO:4 {	POI #1	2.35	.20	.17	2.70	***
	#2	.86	.04	.02	1.05	
	#3	.14	.14	.14	.13	***
	#4	1.69	.04	.01	.56	***
	#5	.00	.24	.24	.00	
	#6	.34	.30	.30	- .23	
	#7	.21	.14	.14	- .18	
	#8	.19	.06	.06	- .22	
	#9	.34	.23	.22	.21	
	#10	1.48	.53	.51	- .77	
	#11	7.19 **	.59	.53	-1.15	
	#12	.17	.07	.06	.17	
HO:2 {	P of HN #1	.06	.32	.32	-1.62	***
	#2	2.47	.28	.25	.71	
	#3	.52	.25	.24	.70	
	#4	.38	.08	.08	-2.67	
	#5	3.66	.19	.14	-3.25	
	#6	4.60	.27	.21	- .06	

* significant with alpha = .05

** significant with alpha = .01

*** qualified by interaction test; see text and figures 4-1 to 4-10

Table 4-2

Tests of Hypotheses 1, 2, 3, and 4, Part 1 of Study

Sub-hypotheses B
Change II Experimental vs. Change I Control

Hypotheses and Variables		F ratio df=1/59	R ² full model	R ² restricted model	Adjusted difference (experimental-control)	
HO:1	RDS	.04	.00	.00	.47	
HO:3	TCA	#1	1.31	.32	.30	-1.48
		#2	.22	.06	.06	.70
		#3	.88	.06	.05	-1.28
		#4	3.76	.07	.01	-2.57
		#5	.03	.00	.00	.27
HO:4	POI	#1	.58	.17	.16	1.44
		#2	6.62 *	.12	.03	3.22
		#3	.19	.51	.51	.20
		#4	9.66 **	.17	.03	1.92
		#5	1.57	.10	.08	.78
		#6	13.47 **	.29	.13	1.94
		#7	15.87 **	.27	.07	1.93
		#8	4.69 *	.12	.05	1.25
		#9	10.88 **	.24	.10	1.75
		#10	18.80 **	.55	.41	3.33
		#11	.32	.37	.36	-.44
		#12	3.74 *	.10	.05	1.16
HO:2	P of HN	#1	.35	.21	.21	-1.02
		#2	3.45	.15	.11	-2.53
		#3	2.35	.14	.11	2.68
		#4	5.29 *	.08	.00	3.50
		#5	1.30	.23	.21	-2.39
		#6	.34	.28	.28	-1.16

* significant with alpha = .05

** significant with alpha = .01

*** qualified by interaction test; see text and figures 4-1 to 4-10

Table 4-2

Tests of Hypotheses 1, 2, 3, and 4, Part 1 of Study

Sub-hypotheses C
Change I Experimental vs. Change II Experimental

Hypotheses and Variables		T ratio df=25
HO:1	RDS	-.12
HO:3	TCA	#1 .13
		#2 .23
		#3 .31
		#4 -.07
		#5 .20
HO:4	POI	#1 -.22
		#2 .50
		#3 -.02
		#4 .42
		#5 .18
		#6 .77
		#7 .75
		#8 .65
		#9 .49
		#10 .80
		#11 -.02
		#12 .33
HO:2	P of HN	#1 -.14
		#2 -.10
		#3 .18
		#4 .33
		#5 .14
		#6 .23

higher. For students with scores near the mean, no change can be expected from the beginning of the program to the end of the coursework.

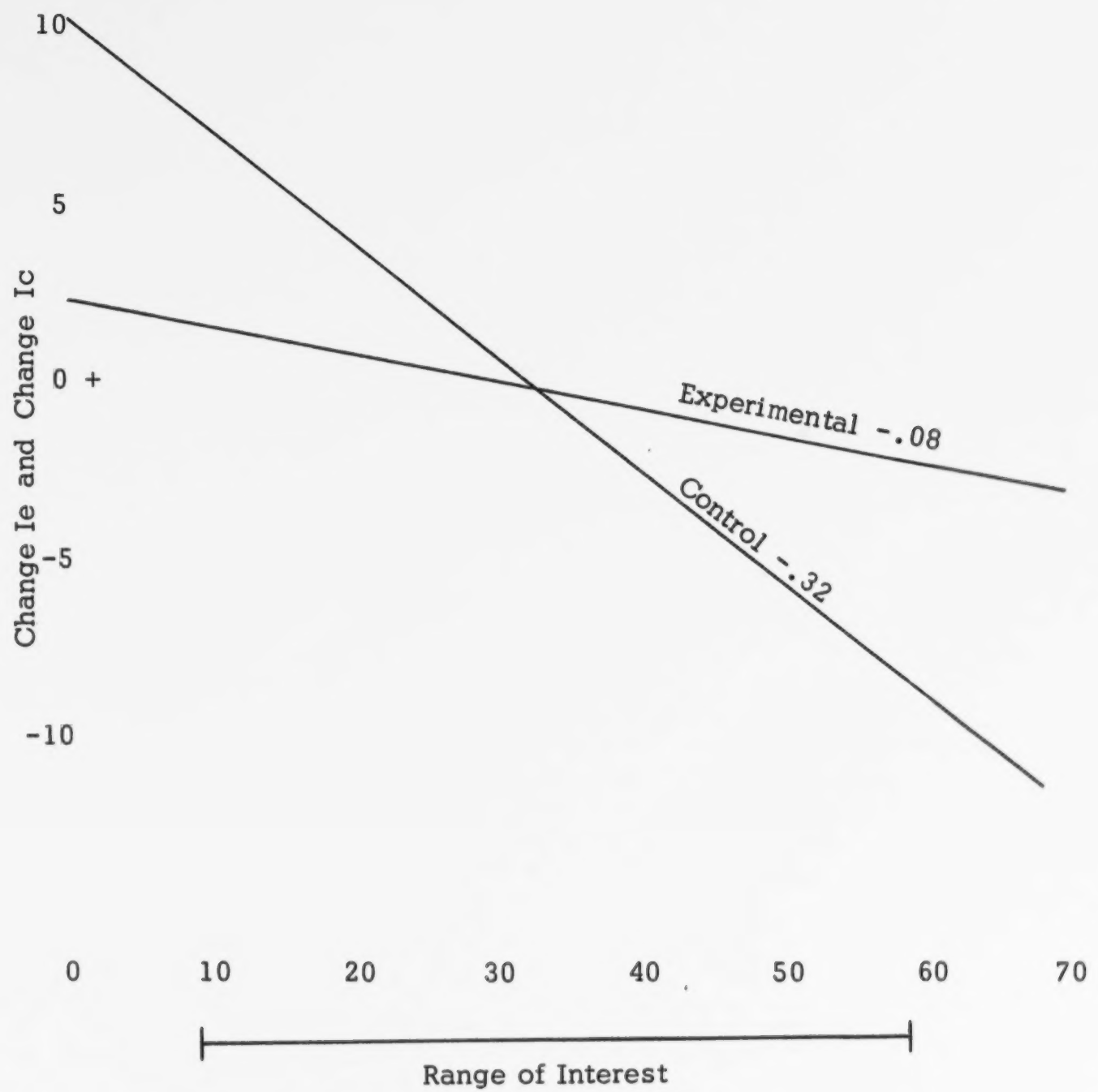
In Figures 4-1 through 4-10 (pages 35 to 46), which report these cases of interaction between the concomitant variable and the criterion variable, the range of interest on the concomitant variable has arbitrarily been defined as the mean for the total sample (experimental and control groups) on the concomitant variable, plus or minus two standard deviations. This range would encompass approximately ninety-five per cent of the subjects.

In connection with sub-hypothesis b of the second hypothesis, it was found that the relationship between the pre-test score and the change score was not the same for the experimental and control groups on the Complexity scale of the PHN. This is presented graphically in Figure 4-2 (page 36). This indicates that for students with lower pre-test scores, a greater amount of positive change is expected in the experimental group, whereas with students with higher pre-test scores, a greater amount of negative change is expected in the experimental group. In both of these situations where significant interactions occurred between the pre-test and the change score (Figures 4-1 and 4-2) (pages 35 and 36), it is inappropriate to speak of a single group difference between the experimental and control groups. The actual differences between students in the experimental and control groups with the same pre-test scores are indicated by the vertical distances on the figures between the regression lines. It will be noticed in both cases that these distances do not become of practical significance until the extremes of the range of interest on the concomitant variable are reached.

The only unqualified significant difference for hypothesis 2, sub-hypothesis b, is found when the Change I score for the control group is compared with the Change II score for the experimental group on the Independence scale of the PHN. At the .05 level, this analysis indicates that students in the experimental treatment (can be expected to have change scores approximately 3.5 points greater (during the practicum period) than the change score observed for students in the control group, when the pre-test scores are the same.

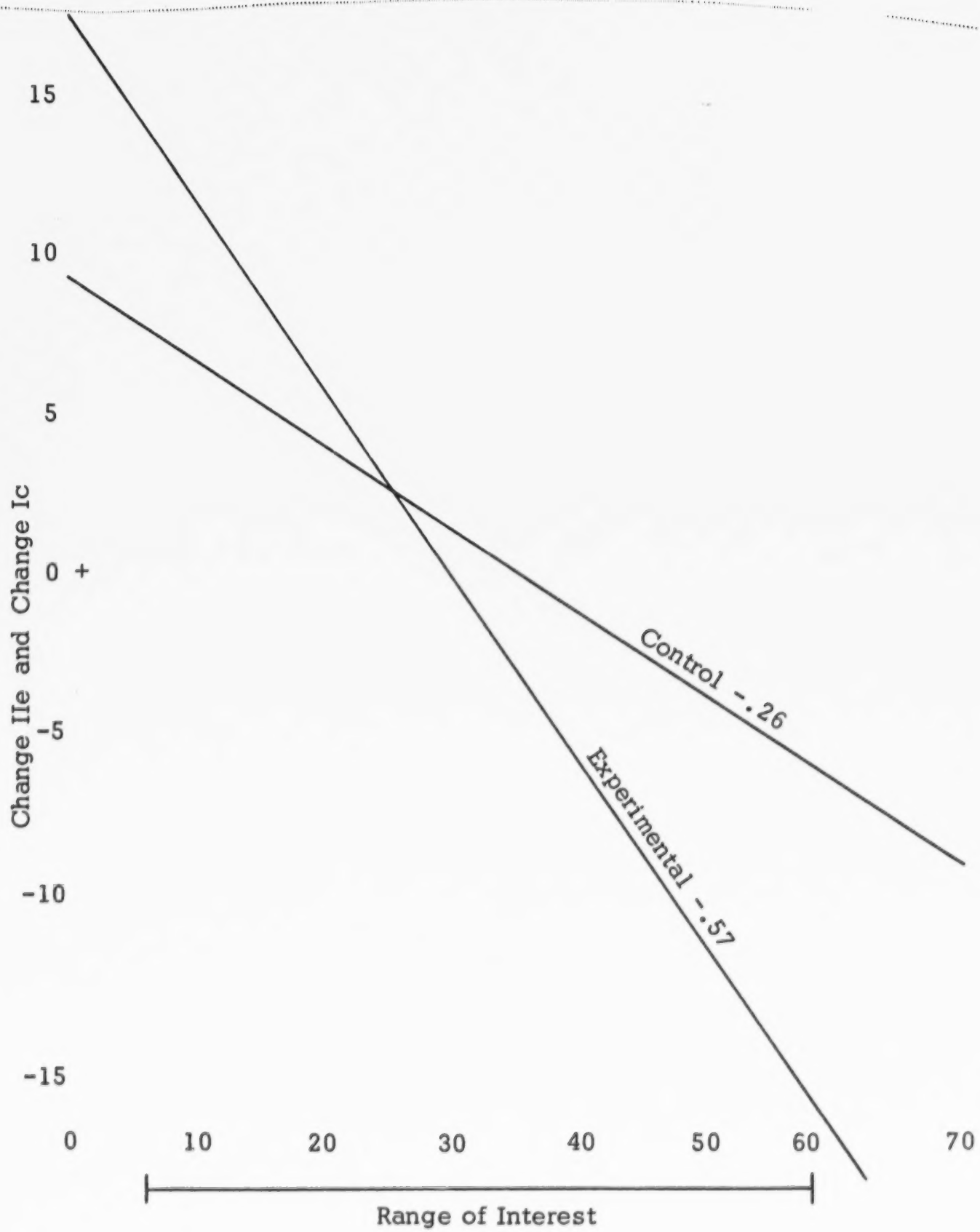
Hypothesis 3 examined differences between change scores on the Test of Counselor Attitudes (TCA) sub-scales. Two group differences, significant at the .05 level, were identified for sub-hypothesis a. These were for the Understanding and Probing sub-scales of the TCA. One of these, however, is qualified by the preceding interaction test between the pre-test score and the criterion change variable. This is for the Understanding sub-scale. In addition, two other significant interactions occurred for the Interpretive sub-scale of the TCA, and sub-hypotheses a and b respectively. In Figure 4-3 (page 37), the unequal regression

Figure 4-1



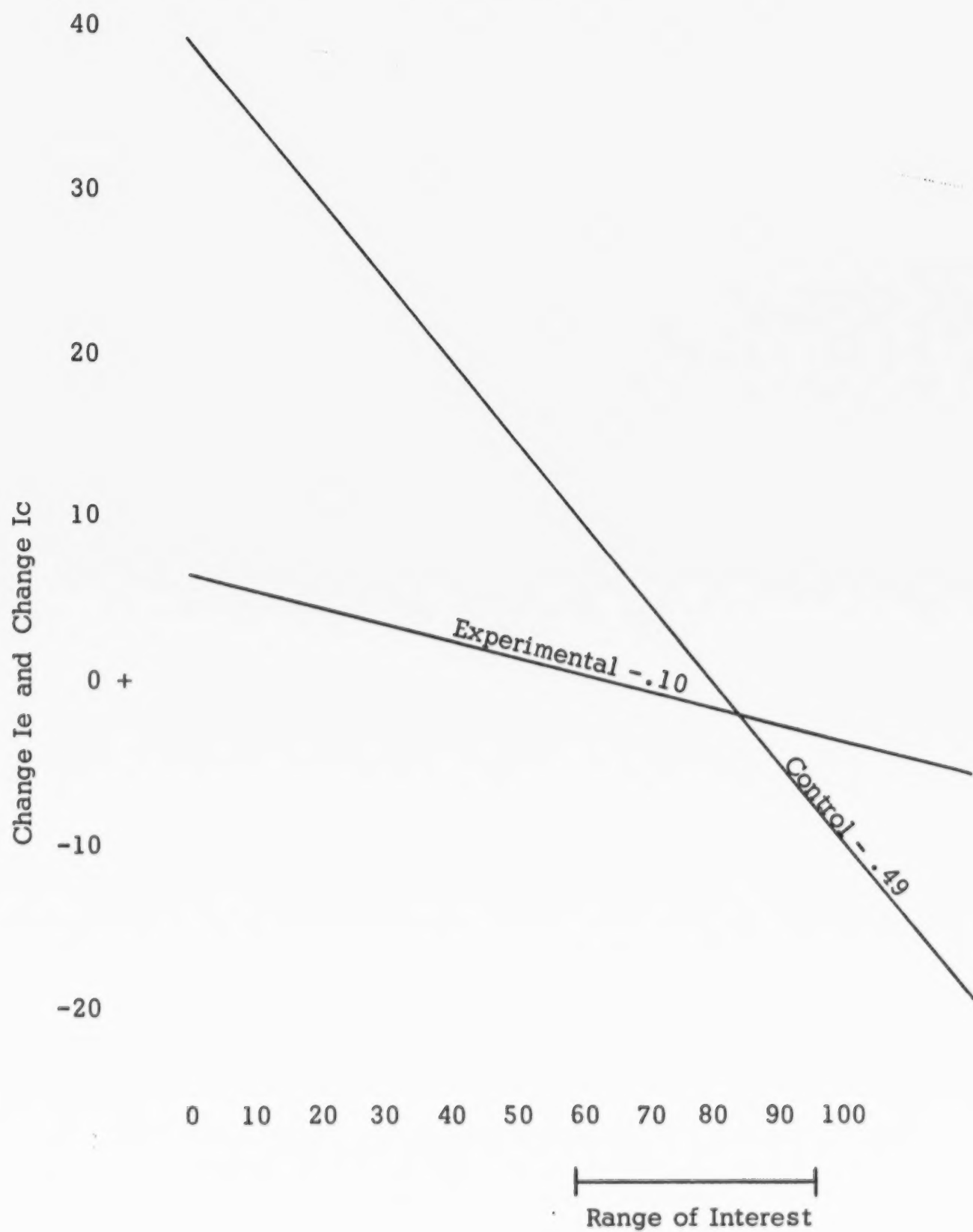
Trustworthiness Sub-Scale of PHN, Time A
Total Mean 33.8
S. D. 12.4

Figure 4-2



Variability Sub-Scale of PHN, Time Be and Time Ac
Total Mean 32.5
S. D. 13.0

Figure 4-3



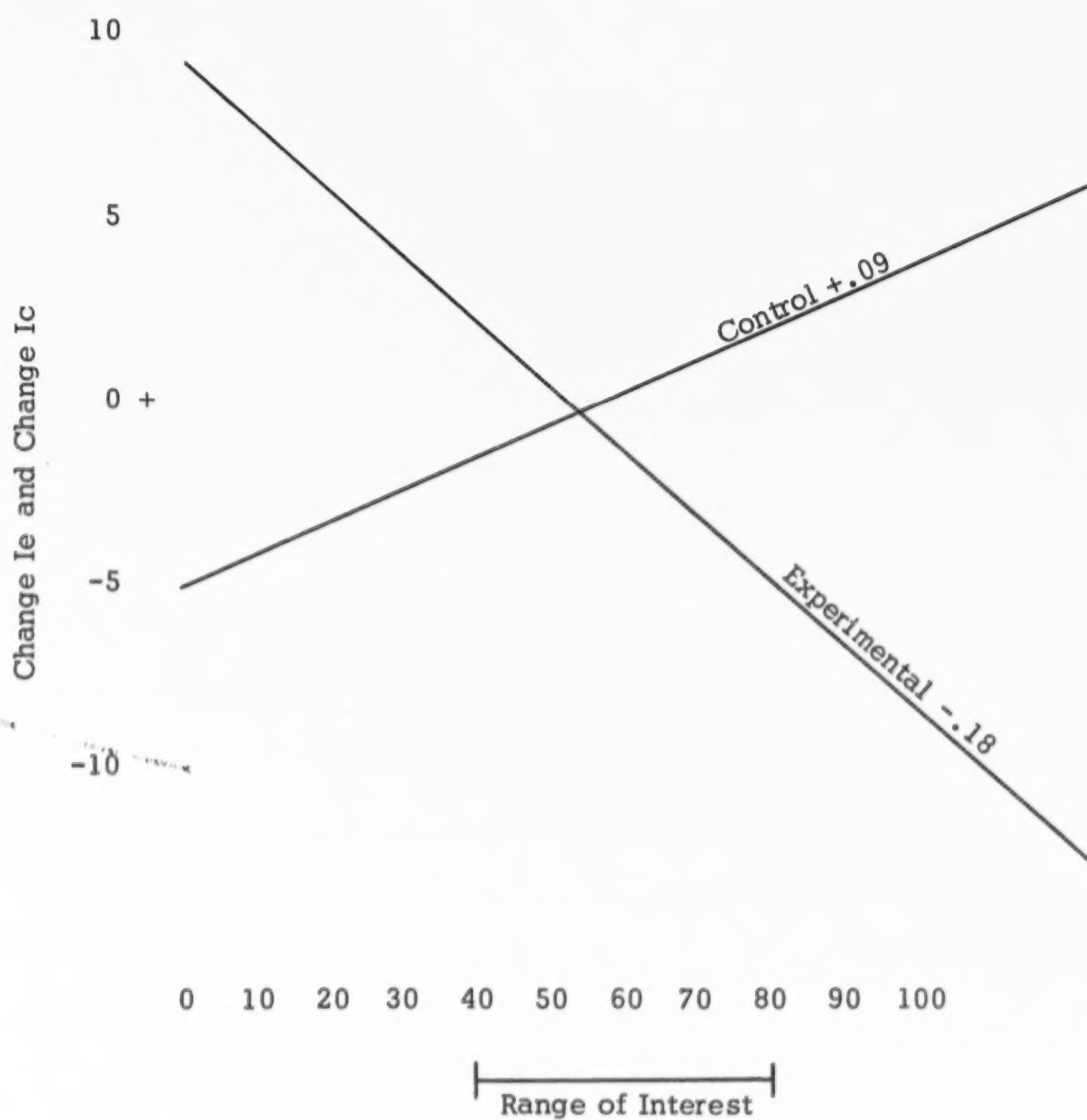
Evaluative Sub-Scale of TCA, Time A
Total Mean 76.9
S. D. 9.2

lines for TCA sub-scale 1 are presented. These indicate that for students with lower pre-test scores, a greater amount of change in the positive direction can be expected in the control treatment, whereas for students with higher pre-test scores, a greater amount of negative change can be expected for students in the control group. As before, the interaction of the two lines is approximately in the middle of the range of interest, which means that no true group differences can be expected until the extremes of the range of interest are approached. For the Probing sub-scale of the TCA, a true group difference exists, since the relationship of pre-test and criterion change score can be considered the same for both groups. At the .05 level of significance, it is found that the control group and experimental group can both be expected to change in the positive direction on the Probing sub-scale of the TCA, but that the amount of expected change is approximately two points less for the experimental group than for the control group, when initial pre-test levels are held constant. No significant differences were found for sub-hypotheses b and c.

Figure 4-4 graphically presents the interaction for the Interpretive sub-scale of the TCA of pre-test scores and Change I scores expected during the coursework period for the control and experimental groups. Again, no group differences may be said to exist, except at the extremes of the range of interest on the concomitant variable. It is interesting, however, that the direction of the relationship is different for the two groups. In other words, students with initially high scores on the Interpretive sub-scale of the TCA can be expected to increase their scores if placed in the control group, whereas their scores would be expected to decrease resulting in negative change if placed in the experimental group. Conversely, students with lower initial scores on the Interpretive sub-scale of the TCA are found to have even lower scores when re-tested at the end of the coursework period if placed in the control treatment, whereas students with low initial scores can be expected to have higher scores when retested at the end of the coursework period if they are placed in the experimental group. Again, these differences occur only at the extremes of the range of interest on the pre-test, and for students with approximately average scores, no great amount of change is observed.

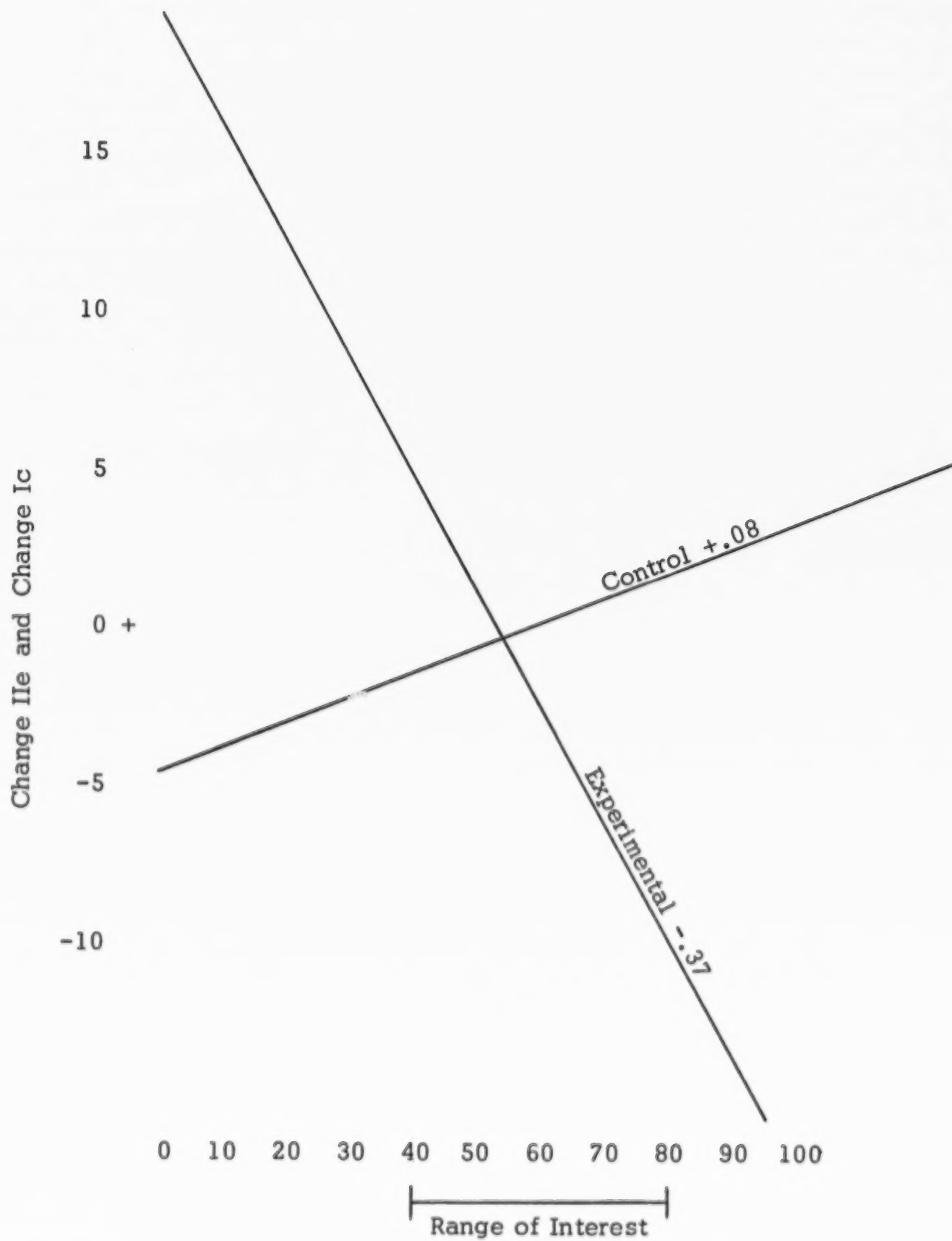
Figure 4-5 (page 40) presents graphically the results of the interaction test for the Interpretive sub-scale of the TCA sub-hypothesis b. Here the amount of change in the control group in the coursework period (the only change score available for this group) is being compared to the amount of change during the practicum phase of the program for the experimental group. The concomitant variable then consists of the time-a test on the Interpretive sub-scale of the TCA for the control group and time-b test on the same scale for the experimental group. The results are similar to those found for this same sub-scale (Interpretive-TCA)

Figure 4-4



Interpretive Sub-Scale of TCA, Time A
Total Mean 60.8
S. D. 10.2

Figure 4-5



Interpretive Sub-Scale of TCA, Time Be and Time Ac
Total Mean 60.5
S. D. 9.7

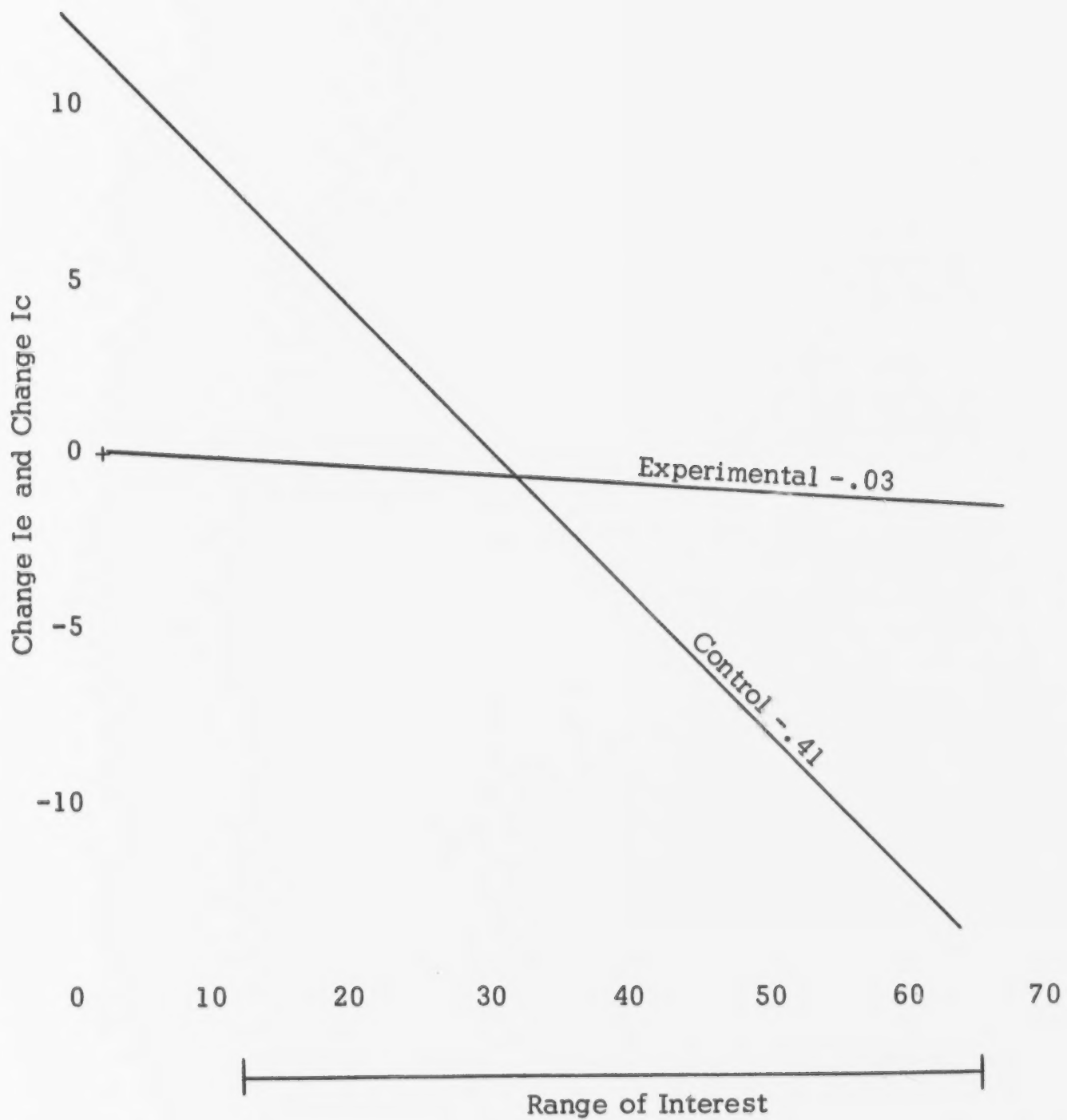
in connection with sub-hypothesis a, which compared the change for both groups during the coursework part of the program. It is interesting to observe that the relationship is more extreme for the experimental group than in Figure 4-4 (page 37). The regression slope is doubled, in the negative direction, from $-.18$ to $-.37$. In other words, the scores for students undergoing the practicum experience, with initially high levels, can be expected to decrease even more than during the coursework part of the program. Conversely, students with initially low scores on the Interpretive sub-scale of the TCA can be expected to increase these scores to a greater extent at the end of the practicum.

Hypothesis 4 was concerned with the comparison of change scores on the twelve sub-scales of the Personal Orientation Inventory (POI). For sub-hypothesis a, only one significant group difference was found, this being for the Acceptance of Aggression sub-scale of the POI. This indicates that for students in the experimental treatment, a decrease can be expected in the Acceptance of Aggression sub-scale of the POI, whereas for the control group, no essential change occurs.

Figures 4-6 through 4-8 (pages 42 to 44) present the significant interaction tests found in connection with sub-hypothesis a, of hypothesis 4. These occurred for the Time, Support, and Existentiality sub-scales of the POI. On these sub-scales, these figures indicate that for students with higher test scores at the beginning of the coursework period, these scores can be expected to decrease when retested at the end of the coursework period if placed in the control groups. Conversely, the retest scores can be expected to be higher resulting in positive change scores if initially low scoring students are placed in the control group. For students in the experimental group, the amount of change is essentially unrelated to the initial pre-test level, since the regression lines for the experimental group are essentially horizontal.

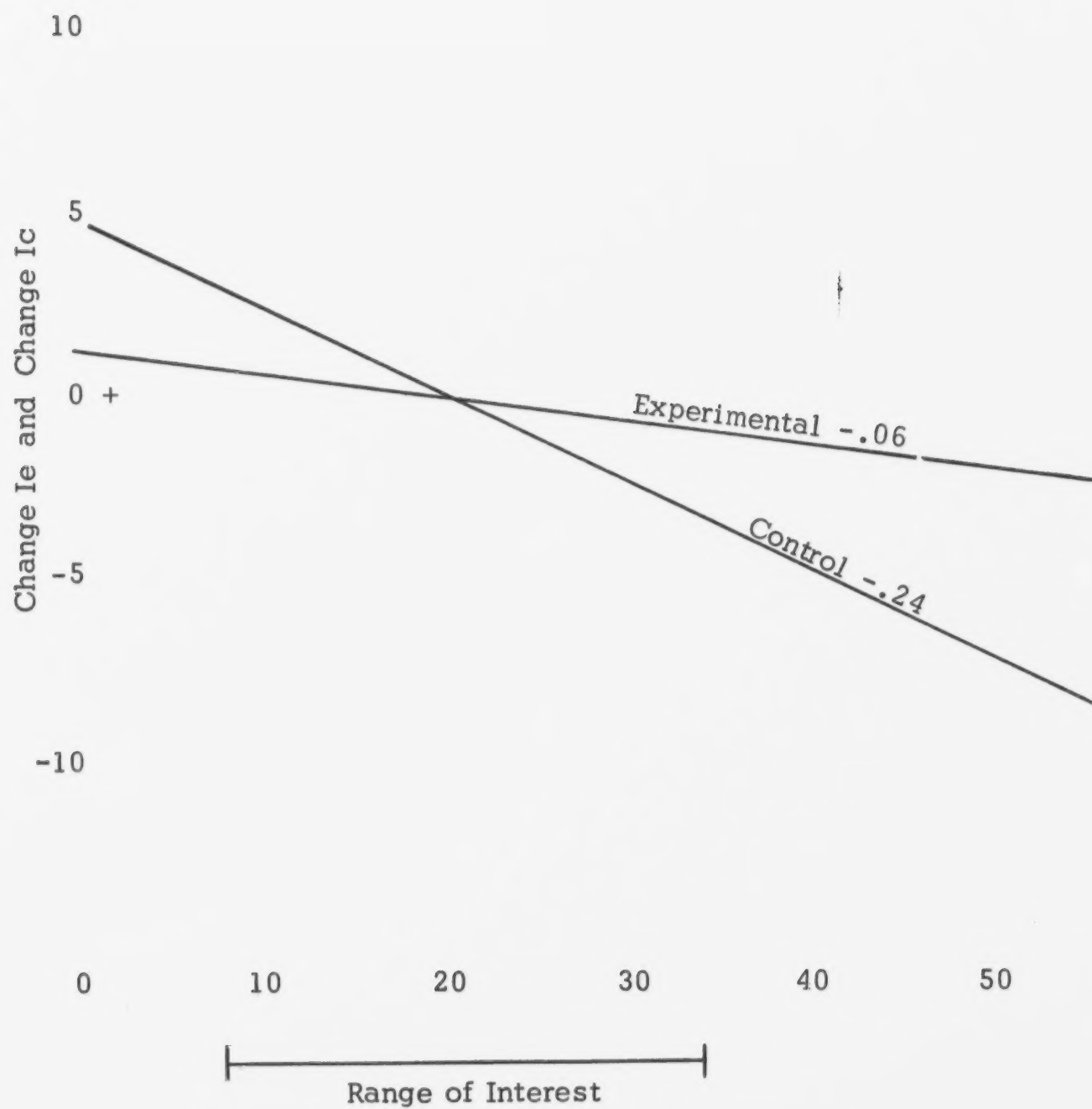
For sub-hypothesis b of the fourth hypothesis, eight of the sub-scales produced significant differences between experimental and control groups. None of these eight differences were qualified by interaction tests between pre-test and change scores. This sub-hypothesis, which compared the amount of change in the experimental group during the practicum with the amount of change in the control group, indicates that a significant amount of positive change occurs for the experimental group, whereas little if any change occurs for the control group. This occurs for the Support, Existentiality, Spontaneity, Self-Regard, Self-Acceptance, Nature of Man, Synergy, and Capacity for Intimate Contact sub-scales of the POI. These are presented graphically in Figures 4-9 and 4-10 (pages 45 and 46). These indicate that for the Time sub-scale of the POI, students with initially high pre-test scores in the control group can be expected to have lower scores when retested, whereas those with initially low pre-test scores can be expected to have higher

Figure 4-6



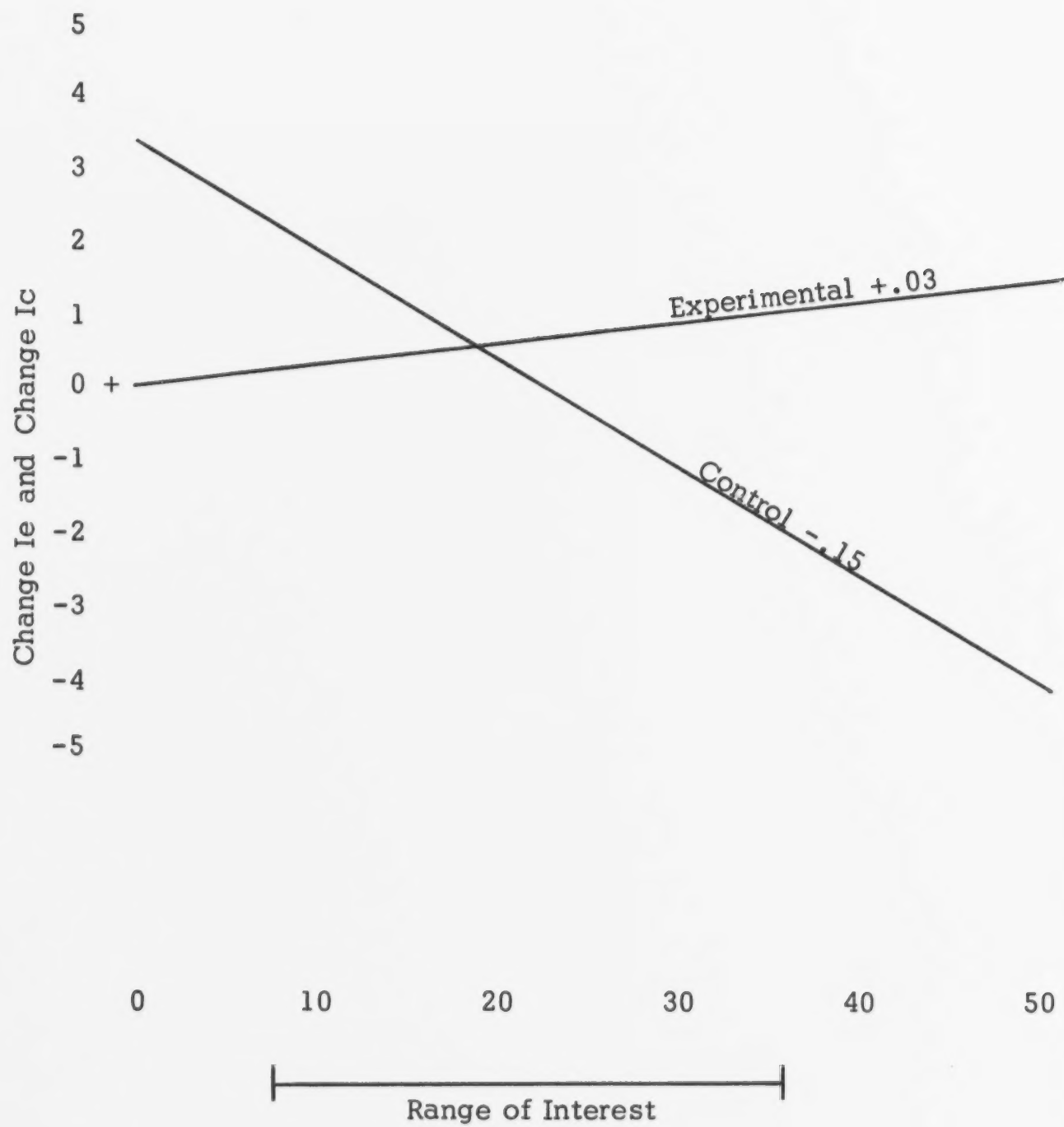
Time Sub-Scale of POI, Time A
Total Mean 39.0
S. D. 13.1

Figure 4-7



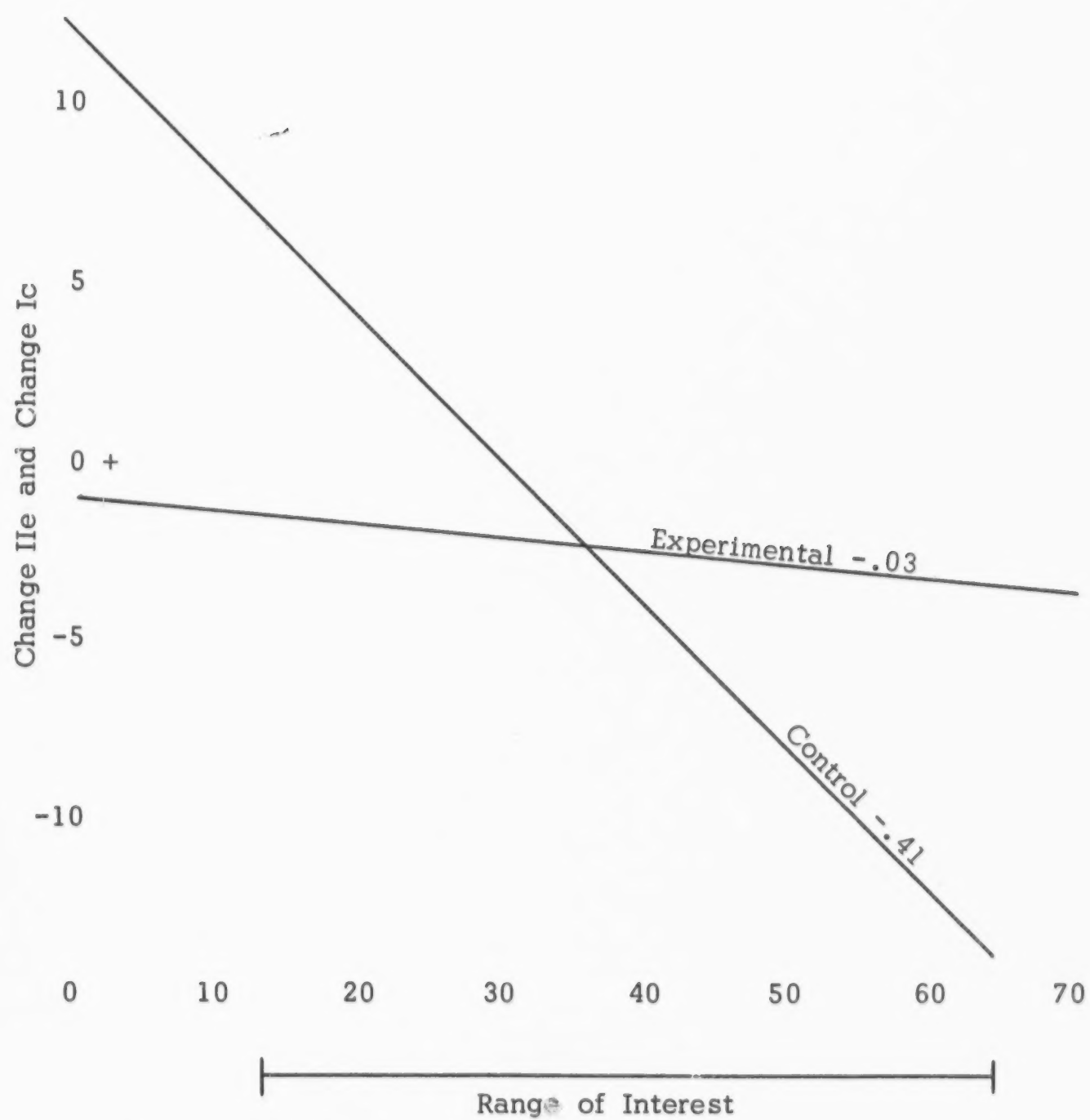
Self-Actualizing Sub-Scale of POI, Time A
Total Mean 21.0
S. D. 6.5

Figure 4-8



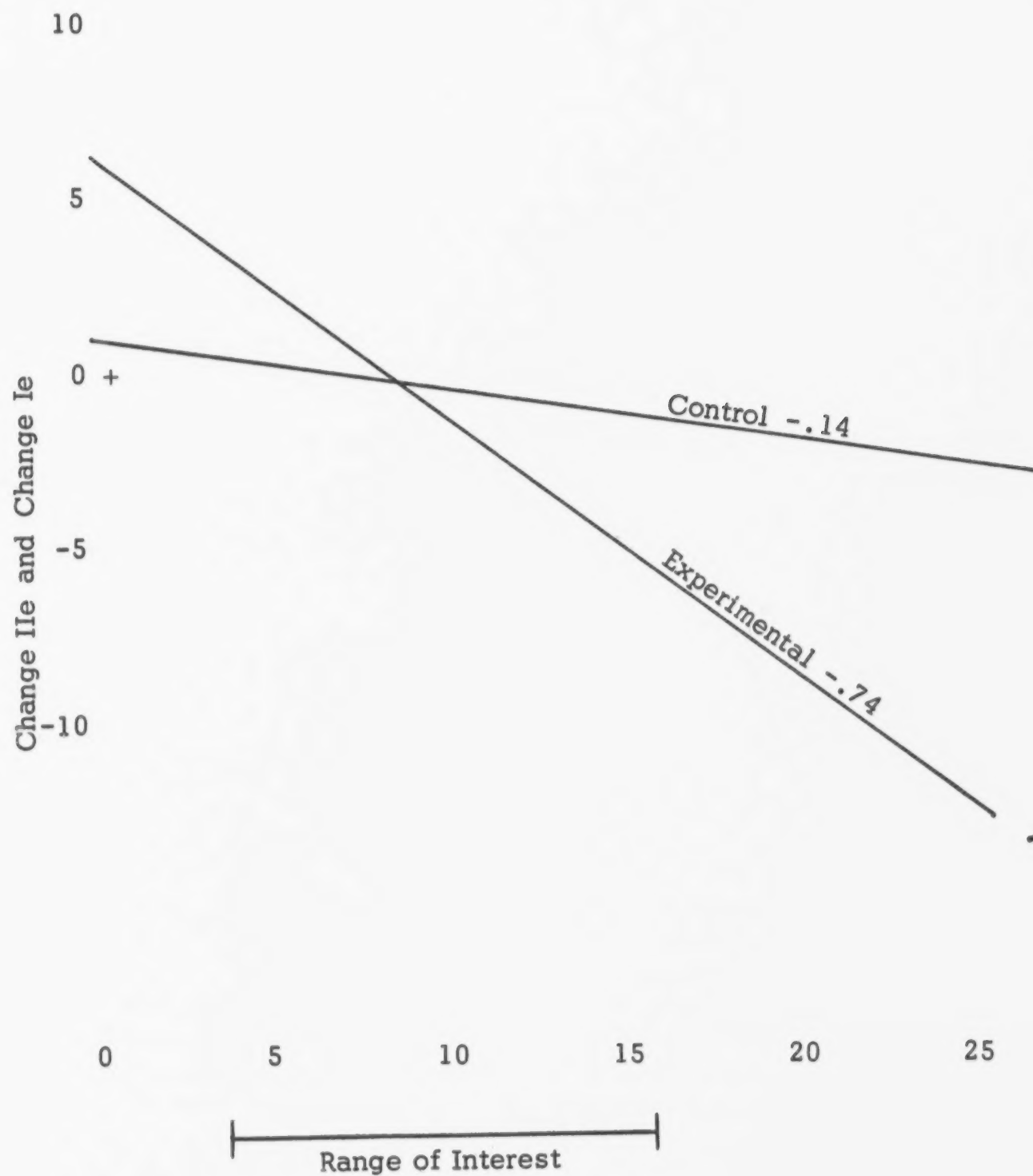
Existentiality Sub-Scale of POI, Time A
Total Mean 21.4
S. D. 7.0

Figure 4-9



Time Sub-Scale of POI, Time Be and Time Ac
Total Mean 38.6
S.D. 12.8

Figure 4-10



Acceptance of Aggression Sub-Scale of POI, Time Be and Time Ac
Total Mean 9.7
S. D. 3.0

scores when retested. For students in the experimental group, when tested before and after the practicum experience, the initial test level is essentially unrelated to the amount of change, since the regression line differs little from zero. For the Acceptance of Aggression sub-scale of the POI, it is found that, in general, for students with higher initial pre-test scores, a decreased score level is found upon retesting; whereas for students with higher pre-test scores an increased level is found upon retesting. The relationship is much stronger for the experimental group, however, than the control group. This indicates that during the practicum experience, students may be expected to evidence much lower scores on retest, if their initial scores are high, and much higher on retest, if their initial scores are low, and if they are in the control group.

Hypothesis 5 stated that there would be no significant difference between the pre-test and post-test scores on the Counselor Rating Blank (CRB) for the experimental group. The experimental group alone received this instrument. The pre-tests were administered between the coursework and practicum phase of the program, and the post-test occurred at the end of the practicum experience. A *t* ratio of 1.36 with 25 degrees of freedom was computed, allowing for a correlation of +.77 between the pre- and post-test scores for the 27 students in the experimental group. This is not significant at the .05 level; thus, this hypothesis is not rejected. A significant amount of change does not occur on the CRB during the practicum part of the program.

Part II

Table 4-3 (page 48) presents some descriptive statistics for the pre-tests, post-tests, and change variables (post-test minus pre-test) used in Part II of the study. It will be noticed that on all but two of the measures, a slight increase, based on the total sample, occurs from pre-test to post-test. Slight decreased occur on the Wanted Control scale of FIRO-B and the Self-Image Questionnaire sub-scale for Others. Although not a specific hypothesis of this study, these changes were tested for statistical significance. Only four of the pre-test, post-test differences, based on the total sample, were significant at the .05 level. These were for the Expressed Inclusion and Expressed Affection sub-scales of the FIRO-B test, the Tennessee Self-Concept Scales (TSCS), and the Counselor Rating Blank (CRB).

In Table 4-4 (page 49) the relevant statistics for hypothesis one of Part two of the study are reported. Hypothesis one was concerned with the differences between the presence or absence of selected treatments on the criterion variables, which consisted of the change scores (post-test minus pre-test) on the six sub-scales of FIRO-B, the Tennessee

Table 4-3

Descriptive Statistics for Part II of the Study

Total Sample, N = 199

		Pre-test		Post-test		Change (Post-Pre)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
FIRO-B	e ^I	5.27	1.76	6.21	6.53	.94	6.65
	e ^C	3.04	2.34	3.28	2.98	.24	2.76
	e ^A	4.51	2.51	5.25	4.02	.74	3.78
	w ^I	4.98	3.13	5.01	3.10	.02	2.58
	w ^C	4.52	6.00	4.03	3.20	-.49	6.31
	w ^A	5.68	2.25	5.96	3.35	.29	3.61
TSCS		356.87	48.88	363.80	44.66	6.93	25.89
SIQ-Social		91.40	9.02	91.49	6.77	.09	8.84
SIQ-Self		90.19	10.08	90.58	8.34	.40	9.50
SIQ-Others		277.96	46.26	273.80	57.42	-4.16	61.47
CRB		21.09	4.93	28.12	6.39	7.03	4.58

Table 4-4

Analyses for Hypothesis 1 of Part II

Variables	Experimental Groups (I_1) vs Control Groups (I_2)				Conducting Group Sessions (C_1) vs Not Conducting Group Sessions (C_2)				Intensive Group Experience (I_1) vs No Intensive Group Experience (I_2)				Summer Session (T_1) vs Regular Fall-Spring Semester (T_2)			
	F ratio df=1/186	R^2 restricted model	R^2 full model	Adjusted difference $I_1 - I_2$	F ratio df=1/186	R^2 restricted model	R^2 full model	Adjusted difference $C_1 - C_2$	F ratio df=1/186	R^2 restricted model	R^2 full model	Adjusted difference $I_1 - I_2$	F ratio df=1/186	R^2 restricted model	R^2 full model	Adjusted difference $T_1 - T_2$
FIRO-B	7.03**	.11	.07	-3.06***	1.02	.08	.07	-.92	1.12	.08	.07	-1.15	1.45	.08	.07	.97
e ^C	0.00	.19	.19	0.00	0.00	.19	.19	0.00	5.42*	.21	.19	-.90	0.00	.19	.19	0.00
e ^A	0.00	.08	.08	0.00	0.00	.08	.08	0.00	0.00	.08	.08	0.00	1.06	.09	.08	.64
w ^I	0.00	.22	.22	0.00	.99	.22	.22	.42	.63	.22	.22	.29	2.62	.23	.22	.52
w ^C	0.00	.76	.76	0.00	.80	.76	.76	-.41	0.00	.76	.76	0.00	.14	.76	.76	.46
w ^A	0.00	.47	.47	0.00	.96	.47	.47	.34	0.00	.47	.47	0.00	0.00	.47	.47	0.00
TSCS	1.23	.21	.20	5.07	3.36	.21	.20	6.69	.44	.20	.20	-2.35	0.00	.20	.20	0.00
SIQ-Social	33.51**	.61	.54	6.73***	.41	.54	.54	.57	3.27	.55	.54	1.94	0.00	.54	.54	0.00
SIQ-Self	25.87**	.58	.52	6.17	1.27	.52	.52	.85	9.35**	.54	.52	2.65***	0.00	.52	.52	0.00
SIQ-Others	3.31	.37	.36	14.66	0.00	.36	.36	0.00	.02	.36	.36	-4.43	2.87	.37	.36	-13.11
CRB	10.34	.17	.12	3.15	17.25**	.19	.12	2.95***	34.73**	.26	.12	3.74***	.75	.12	.12	-.83

* significant with alpha = .05

** significant with alpha = .01

*** qualified by interaction with pre-test concomitant variables or interaction of treatments (Hypothesis 2); see text and Figures 4-11 through 4-16.

Self-Concept Scale (TSCS), the three sub-scales of the Self-Image Questionnaire (SIQ), and the Counselor Rating Blank (CRB). The total sample was divided four times into four different time group classifications. The first division, called experimental and control groups (I_1 and L_2) provided a basic test between students exposed to regular classroom instruction in counseling techniques and those not exposed to this treatment. The second subdivision divided students into those who had been required to conduct group sessions and those who did not conduct group sessions (C_1 and C_2). The third subdivision divided students into those who had gone through an intensive group experience and those who had not had this experience (I_1 and I_2). Finally, since the study involved students enrolled in summer session work, as well as regular fall-spring semesters, the last subdivision reflected this difference (T_1 and T_2).

Reference back to Figure 3-1, in Chapter III, will reflect the highly compounded nature of this design. It was for this reason that these two group tests were conducted for hypothesis one. Hypothesis two was concerned with the possible two-way treatment interactions, which could qualify any of the basic group differences tested in hypothesis one. The results for hypothesis two are presented in Figures 4-14 through 4-16. Only those significant at the .05 level are reported since the only purpose of testing hypothesis two was to identify qualifications which must be placed on significant differences indicated by hypothesis one.

One word of explanation might be offered about some of the figures in Table 4-4 (page 49). Since the method of analysis described in Appendix B required a large number of simultaneous equations to be solved, a relatively large iteration criterion was given to the computer in order to not use an exorbitant amount of time. The analyses for hypothesis one of part two of the study required the solution of 616 separate regression equations (most of them with 23 predictor variables, and 528 separate F ratios). The computer was instructed to stop iterating when the addition of a variable to the equation did not increase the squared multiple correlation coefficient by .001 or a greater amount. Therefore, in some of the tests reported in Table 4-4 F ratios of zero, indicating no adjusted differences between the treatments, are reported. If more accurate computation had been undertaken, F ratios slightly greater than zero would have been produced. In no case, however, would a significant F ratio have been produced. These zero F ratios indicate that the vector representing group differences did not enter the regression equation before the iteration stop criterion was reached.

As described in Appendix B, before the testing of each hypothesis one, an analysis was conducted to see if there was an interaction between the concomitant variables (pre-test scores) and the two treatment groups. In a number of cases, it was found that the relationship between one or more concomitant variables and the criterion variable, was different

for the two groups. In only three cases did these occur with significant hypothesis one tests, thus necessitating a qualification of the group difference. These are portrayed graphically in Figures 4-11 through 4-13 (pages 54 to 56). Their meaning will be explicated as the significant differences identified in Table 4-4 (page 49) are discussed.

Experimental Group Versus Control Group

When the sample was divided into two groups (experimental versus control), four significant group differences were found. Two of these were not qualified by interaction with pre-test scores or other treatments. One of these indicated that students in the experimental group can be expected to increase their post-test scores approximately six points more than students in the control group on the SIQ sub-scale for Self, when initial levels on the eleven pre-tests are the same. Similarly, students in the experimental group can be expected to increase their post-test scores by approximately three points more than students in the control group on the CRB when initial levels on the eleven pre-tests are the same. Table 4-4 (page 49) indicates that control group students can be expected to increase their post-test scores on the Expected Inclusion scale of FIRO-B approximately three points more than students in the experimental group. This particular test of hypothesis one was qualified, however, since the relationship between the criterion and the pre-test scores for Expressed Affection on the FIRO-B test and the CRB differed for the two groups. These differing regression slopes are presented in Figures 4-11 and 4-12 (pages 54 and 55). In Figure 4-11, a strong negative relationship exists between the Expressed Affection pre-test and the criterion for the control group, and a moderate positive relationship exists for the experimental group. In Figure 4-12, the relationship between CRB pre-test and the criterion are both positive, but the relationship for the experimental group is much more pronounced. The net result of both of these significant interactions would be to decrease the net difference between experimental and control groups as higher initial levels on Expressed Affection of the FIRO-B and CRB are approached. The apparent superiority of the control group, of approximately 3.0, would "disappear" for students with higher pre-test scores on Expressed Affection of the FIRO-B or the CRB. Also, in a related test of hypothesis two, it was found that the differences between experimental and control groups on the Expressed Inclusion sub-scale of FIRO-B differed according to whether enrollments were in the summer or regular fall-spring semesters. This interaction between treatments is indicated in Figure 4-15 (page 58). This figure shows that the apparent superiority of the control group over the experimental group is even greater in the summer than in the regular fall-spring semesters.

Finally, the examination of experimental versus control differences

Table 1-4 (page 49) indicates that the expected increase from pre- to post-test on the Social sub-scale for the SIQ is almost seven points greater for the experimental group than for the control group. In a related test of hypothesis two, which examined for possible interaction between experimental versus control and period of enrollment, it was found that differences between experimental and control groups on this criterion variable differed according to whether the students were enrolled in the summer session or regular fall-spring semesters. This is also indicated in Figure 4-15 (page 58). These figures indicate that the superiority of the experimental group remains during the summer session, but at a much reduced level (approximately 1.5 raw score points). In the regular fall-spring semesters, the apparent superiority of the experimental group is much greater (over nine raw score points).

Conducting Group Sessions Versus Not Conducting Group Sessions

Only one significant group difference was found for hypothesis one. This indicated that on the CRB, the amount of positive change for the students conducting group sessions was almost three points greater than the amount of positive change for students not conducting group sessions. This treatment, however, was found to interact with whether or not the students had also experienced or not experienced an intensive group session themselves, and whether or not their enrollment was in the summer or regular fall-spring semesters. These interactions are represented in Figures 4-14 and 4-16 (pages 57 and 59). Figure 4-14 indicates that the expected difference between students who conducted and did not conduct groups occurs primarily only if they also went through an intensive group experience themselves. Figure 4-16 indicates that this difference is also much greater during the fall-spring semesters than the summer session. Therefore, these treatment interactions still permit us to conclude that students conducting group sessions will increase their scores on the CRB more than students not conducting group sessions, with even greater differences occurring if they also go through intensive group experiences themselves and if they conduct the group sessions during the regular academic year semesters.

Intensive Group Experience Versus No Intensive Group Experience

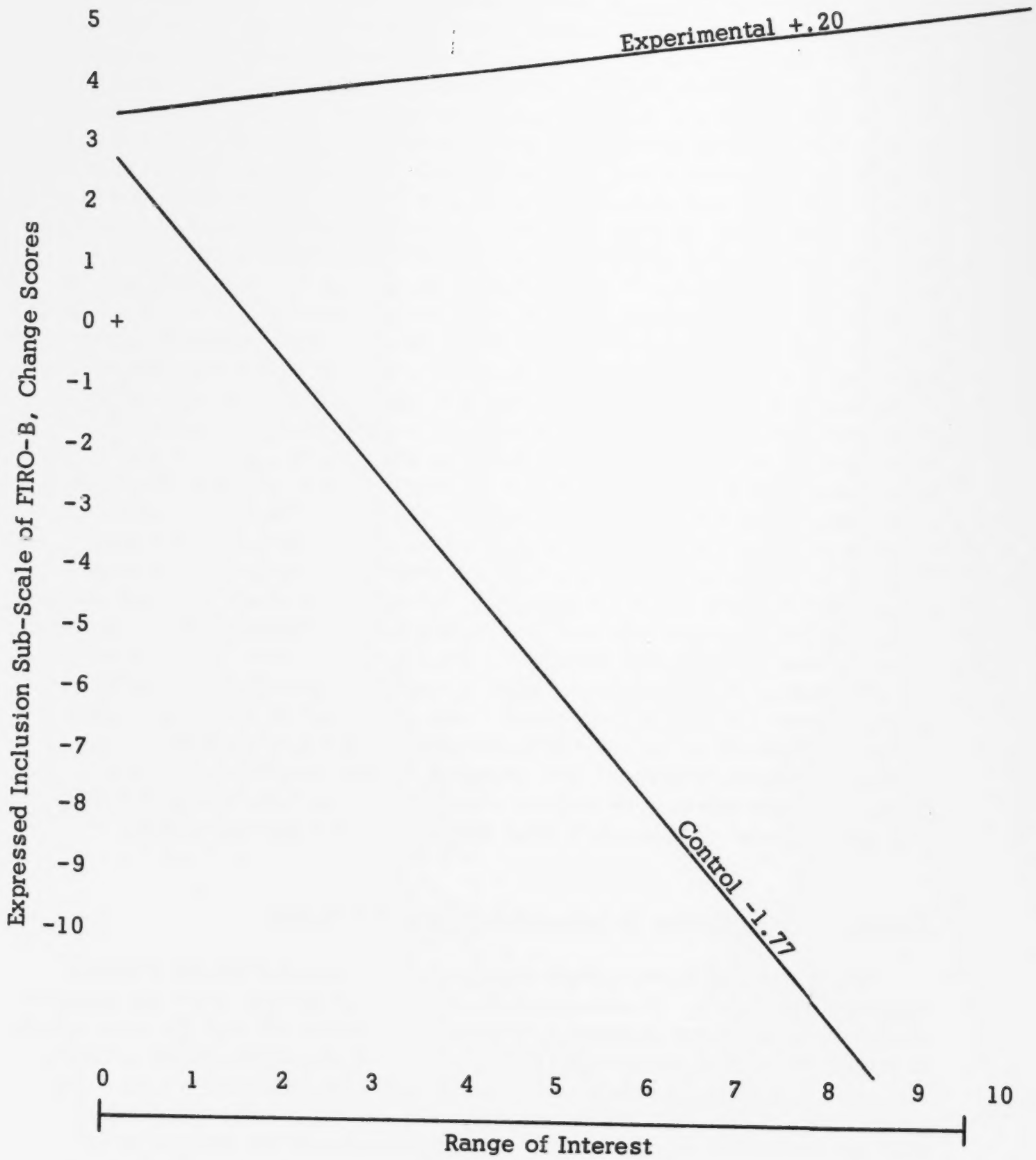
The figures reported in Table 4-4 (page 49) indicate that the Expressed Control scores on the FIRO-B test can be expected to decrease for students who undergo intensive group experiences, whereas students who do not undergo such experiences can be expected to exhibit no change on the test. Again, this hypothesis controls for initial levels on all eleven pre-tests, which in this case did not produce any significant results, and thus do not qualify this group difference. It is also indicated in

Table 4-4 that students undergoing intensive group experiences can be expected to increase their scores on the Self sub-scale of the SIQ and the CRB approximately three points more than students not undergoing intensive group experiences when initial levels on all pre-tests are held constant. With reference to both of these criterion variables, however, there is an interaction between the intensive group experience treatment and whether or not the students also conducted or did not conduct groups of their own. These are indicated in Figure 4-14 (page 57). The superiority of the intensive group experience still exists in the CRB scores even if the student did not also conduct his own groups, but is much greater, over five raw score points, if he did conduct groups of his own. For the Self sub-scale on the SIQ, the direction of the difference is changed. For those who conduct groups of their own, greater scores are expected if they have not undergone an intensive group experience. For those who did not conduct groups, those with an intensive group experience produce higher scores than those without an intensive group experience. Therefore, a single difference on the Self sub-scale of the SIQ cannot be predicted for those undergoing intensive group experiences versus those who do not have an intensive group experience. In fact, the direction of the difference changes, depending upon whether they also conducted or did not conduct groups of their own. The relationship between the Expressed Affection pre-test of FIRO-B and the CRB also differed for the intensive group session treatment. This is indicated graphically in Figure 4-13 (page 56). For those not undergoing the intensive session, a slight positive relationship exists between the Expressed Affection pre-test and the amount of change on the CRB. For those who did experience an intensive session, a marked negative relationship exists between these two variables. The net result of this interaction between intensive group experience treatment and initial level of Expressed Affection reduces the expected overall superiority of the intensive group session treatment in producing positive change on the CRB for students with initially high levels of Expressed Affection.

Summer Session Versus Regular Fall-Spring Semesters

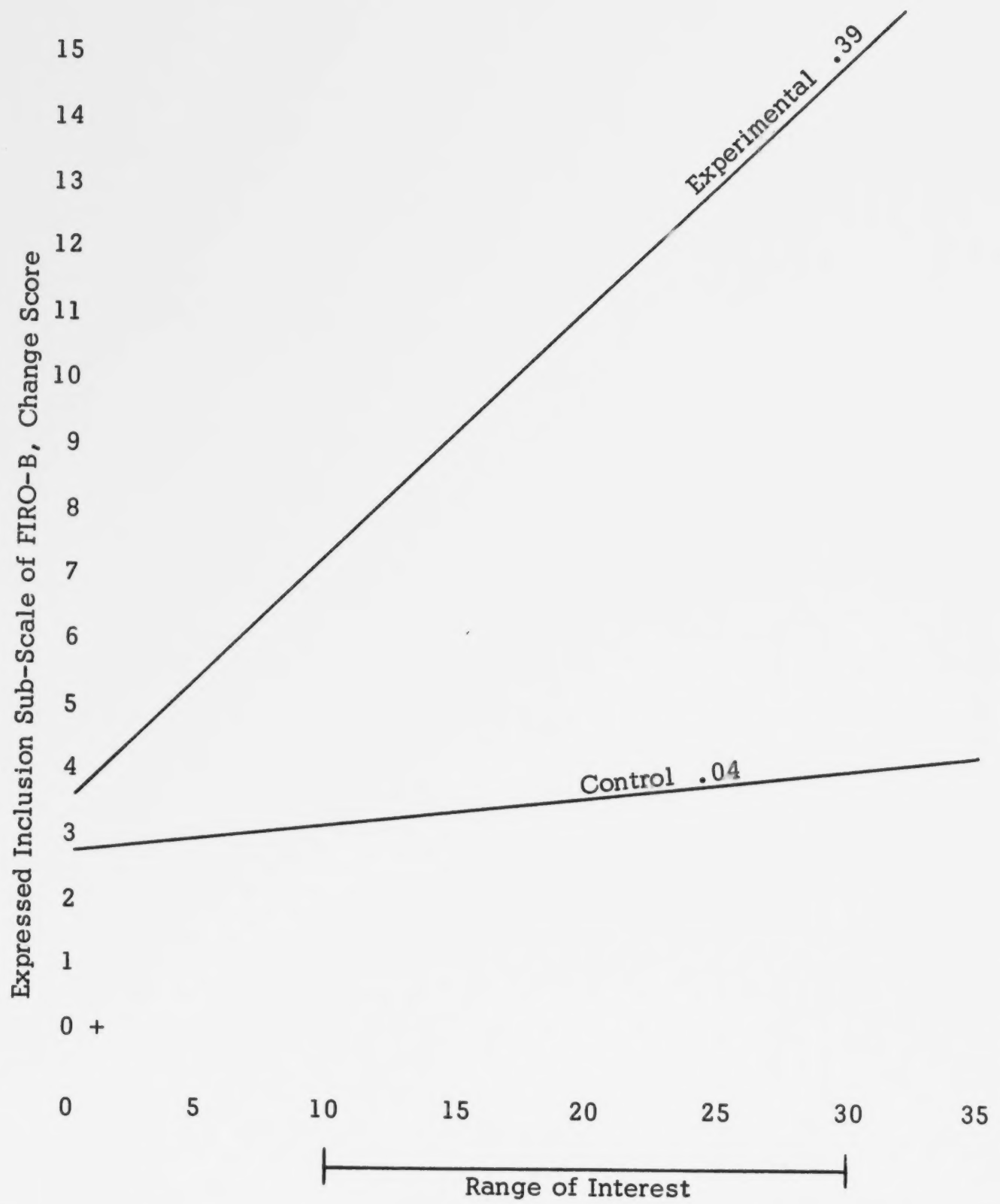
This treatment produced no significant differences on the criterion variables, by itself. It was found to interact, however, with the experimental versus control treatment, Figure 4-15 (page 58) and the conducting of groups treatment, Figure 4-16 (page 59). These interactions indicate that greater positive change can be expected to result on the CRB if students conduct groups of their own during the regular semesters rather than during the summer session. The superiority of the control group, in terms of change on the Expressed Inclusion sub-scale of FIRO-B, is greater during the summer than during the regular fall-spring semesters. The superiority of the experimental treatment, however, in terms of increased scores on the Social sub-scale of the SIQ is greater during

Figure 4-11



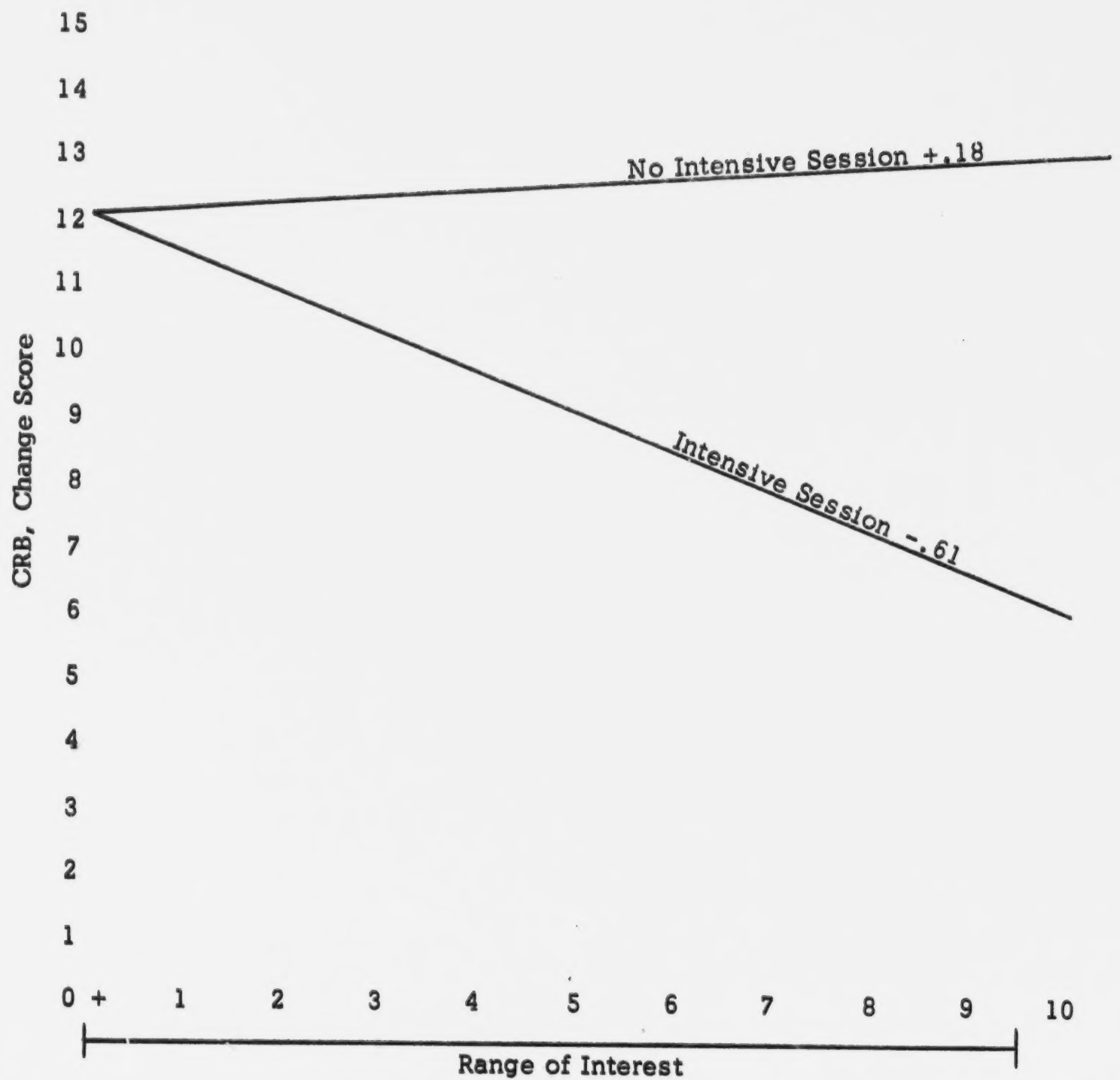
Expressed Affection Sub-Scale of FIRO-B, Pre-test
Total Mean 4.51
S. D. 2.51

Figure 4-12



CRB Pre-test
Total Mean 21.09
S. D. 4.93

Figure 4-13



Expressed Affection Sub-Scale of FIRO-B, Pre-test
Total Mean 4.51
S. D. 2.51

Figure 4-14

Interaction of Conducting Groups and
Experiencing Intensive Group Sessions

Adjusted Cell Means

		C ₁ Conducted Groups	C ₂ Didn't Conduct Groups
I ₁ Intensive Experience	SIQ-Social	74.04	SIQ-Social 77.73
	SIQ-Self	73.77	SIQ-Self 77.06
	CRB	18.02	CRB 14.55
I ₂ No Intensive Experience	SIQ-Social	76.37	SIQ-Social 73.30
	SIQ-Self	77.06	SIQ-Self 71.16
	CRB	12.64	CRB 12.64

Figure 4-15

Interaction of Experimental-Control Groups
and Period Enrolled

Adjusted Cell Means

		L_1 Experimental	L_2 Control
T_1 Summer	FIRO-B, e^I	-2.57	4.79
	SIQ-Social	77.82	76.38
T_2 Fall-Spring	FIRO-B, e^I	-2.57	1.53
	SIQ-Social	79.27	70.11

Figure 4-16

Interaction of Conducting Group Sessions
and Period of Enrollment

Adjusted Cell Means

		C ₁ Conducted Groups	C ₂ Didn't Conduct Groups
T ₁ Summer	CRB	7.83	CRB 7.83
T ₂ Fall-Spring	CRB	11.14	CRB 6.47

during the regular semesters than during the summer.

Conclusions and Recommendations

On the basis of the analysis of data presented in the previous section, the following summary statements, conclusions, and recommendations can be made. As in the other sections, the material will be presented in two parts.

Part I

Changes in prospective counselors' attitudes, personality, and effectiveness in practicum as compared to coursework

Analysis of the data would suggest the following:

1. The experimental group, when compared to the control group, was found to increase in independence as measured by the PHN. The change was approximately 3.5 greater for the experimental group than the control group for students with the same initial levels (hypothesis 2, sub-hypothesis b). The investigator speculates that this significant tendency toward independent behavior on the part of the counselor trainees could perhaps have been a result of the counselor education program's emphasis upon independent behavior as a desirable outcome of training. It is important to note that the PHN deals with a philosophic concept of independence, rather than an actual or operational concept. Thus, it cannot be stated conclusively that the prospective counselors in the experimental group exhibited greater actual independent behavior, only a tendency toward a greater philosophical acceptance of the concept. Perhaps of equal importance is the fact that neither the experimental group nor the control group showed any significant change on the remaining five sub-scales (Trustworthiness, Altruism, Strength of Will, and Rationality, Complexity and Variability of the PHN. All other variables remaining constant, it would have been desirable for the experimental group to have shown significant increases in these desirable counselor characteristics. However, this was not the case.
2. There is evidence in the data to suggest that the experimental group altered its attitude toward probing and interpretive responses as measured by the TCA. For students in the experimental group during both the coursework and practicum phase of the program, those with initially high levels on the Interpretive sub-scale of the TCA lowered their level on this scale when retested,

thus becoming more interpretive. Conversely, experimental students with lower initial levels on the Interpretive scale of the TCA increased their interpretive responses somewhat when retested after either the coursework or practicum phase of the program. This negative relationship between initial test level and change on retest was much stronger during the practicum phase of the program than during the coursework phase. For students in the control group, the relationship was moderately positive. Thus, students with initially high levels on the Interpretive sub-scale of the TCA increased these scores on retest, becoming less interpretive, whereas students with lower levels on the interpretive scale of the TCA decreased on retest, becoming more interpretive (hypothesis 3, sub-hypotheses a and b, preliminary regression slope comparison).

3. Whereas little change was found on the Acceptance of Aggression sub-scale of the POI for the control group, some negative change occurred during the coursework phase of the program for the experimental group. It would follow that the prospective counselors in the experimental group seemed to become somewhat less accepting of their natural aggressiveness and became somewhat defensive and denied and repressed their aggression during the coursework phase of the program (hypothesis 4, sub-hypothesis a). Even though essentially no significant changes occurred on POI sub-scales (Support, Existentiality, Spontaneity, Self-Regard, Self-Acceptance, Nature of Man, Synergy, and Capacity for Intimate Contact) for the control group, one important finding of this study was that for the experimental group during the practicum phase of the counselor education program, a significant amount of change occurred in the positive direction on all eight of these sub-scales. It should be pointed out that the POI is an instrument which measures positive aspects of mental health. The data would indicate that there are certain characteristics incorporated in the practicum phase of the counselor education program which seem to be absent in the coursework phase leading toward the development of greater self-actualization in prospective counselors. The POI exemplifies in its sub-scales the types of behavior presumed to infer excellence in counseling. Therefore, due to the fact that there are several indications that the practicum experience has brought about desirable changes in counselor behavior as measured by these sub-scales, the investigator would underscore the importance of the findings in this portion of the data.
4. No significant amount of change occurred on the RDS or on the CRB in the analysis of the data. The investigator expresses a certain degree of surprise at the non-significant results on the

dogmatism variable of the RDS. However, attempts to explain this phenomena would be unsupportable speculation.

Part II

The effect of a Course in Group Counseling Techniques on Prospective Counselors' Self-Concepts, Self-Images, Social Images, and Interpersonal relations

On the basis of the analysis conducted for Part II, the investigator arrived at the following conclusions:

1. Experimental versus control group comparisons:

- (a) The experimental group was found to be superior to the control group in the amount of positive change on SIQ-Self, SIQ-Social, and CRB. On SIQ-Social, the experimental group was less superior (approximately 1.5 points) in the summer than in the regular fall-spring semesters (approximately 9 points).
- (b) The control group was superior to the experimental group in the amount of positive change on the Expressed Inclusion sub-scale of the FIRO-B. This difference was more pronounced in the summer than during the fall-spring semesters. This difference tended to be less for students having higher pre-test scores on the CRB and/or Expressed Affection sub-scale of FIRO-B and more for students with lower pre-test scores on CRB and/or Expressed Affection sub-scale of FIRO-B.

2. Conducting groups treatment comparison:

Students who conducted their own group sessions exhibited greater positive change on the CRB than students who did not conduct groups. This expected difference was greatly reduced when students did not also participate in an intensive group experience themselves and was greatly increased if they participated in a group experience. The difference was also greater during the long semesters as compared with the summer sessions.

3. Intensive group experience treatment comparison:

The data pointed out conclusively that:

- (a) Students who experienced intensive group sessions exhibited greater positive change on the CRB and the SIQ-Self than students not experiencing intensive sessions. This superiority of the intensive group experience treatment for the CRB was increased if the students also conducted groups of their own. The superiority of the intensive experience treatment was decreased for the SIQ-Self, even reversed for students who also conducted their own groups. (These students show evidence of negative or little change on the SIQ-Self.) For students with higher pre-test levels on the Expressed Affection sub-scale of the FIRO-B, the superiority of the intensive group experience treatment for CRB was also reduced.
- (b) Students who experienced intensive group sessions evidenced negative change on the Expressed Control sub-scale of the FIRO-B.

4. Summer session sus fall-spring semesters comparison:

This "treatment" does not produce any significant difference itself but appears to mediate the effects of the experimental-control treatment on the Expressed Inclusion sub-scale of the FIRO-B and SIQ-Social and the conducting groups treatment on the CRB.

It is the contention of the investigator that the intensive group experience operating in conjunction with group leadership functions is an essential element of teaching leadership in group behavior. It appears that the slightly longer experience with groups during the fall and spring semesters is a more appropriate length of time for accomplishing change on the scales used in this study than the shorter summer sessions.

General Observations

In the beginning of this study, reference was made to some anticipated outcomes of this study. First, it was anticipated that data gathered from this study would be useful in evaluating the practicum and group counseling aspects of the counselor education program at NTSU. It is the feeling of the investigator that significant data was gathered to say that prospective counselors are making attitudinal and behavioral changes in the practicum and the group courses (particularly based on changes made on the POI and the FIRO-B) at North Texas State University. But the investigator suspects that other changes are taking place which this study did not measure. Second, it was hoped that this study could be the beginning of an attempt to predict the attitudes,

personality, and effectiveness of counselors who receive their training at NTSU. This study could not be used as conclusive evidence in predicting the attitudes, personality, and effectiveness of counselors who receive their training at North Texas State. Third, it was anticipated that this study would be useful in determining the extent to which a course in group counseling techniques is effective in producing positive change toward desirable counselor characteristics in prospective counselors. It seems that this study indicates that a course in group counseling techniques is effective in producing positive change toward desirable counselor characteristics in prospective counselors who receive their training at North Texas State. The investigator maintains that studies of this nature are worthwhile and that further investigation should be undertaken to explore other aspects.

Disposition of Hypotheses

As in the previous sections of the study, Part I and Part II will be considered separately in rejecting or affirming the hypotheses. In each part the null hypothesis will be rejected if two or more differences were found to be significant at the .05 level of significance.

Hypotheses

Part I

1. On the Rokeach Dogmatism Scale:

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;
- (b) Change II in the experimental group will not differ significantly from Change I in the control group;
- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

No significant changes occurred between any of the above groups being compared; therefore, in each instance, the null hypothesis cannot be rejected.

2. On the various sub-scales of the Philosophies of Human Nature Scale:

- (a) Change I in the experimental group will not differ significantly from Change I in the Control group;

The null hypothesis is accepted.

- (b) Change II in the experimental group will not differ significantly from Change I in the control group;

A significant difference was found to exist on the Independence sub-scale of the Philosophies of Human Nature Scale. The null hypothesis is, therefore, partially rejected.

- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

The null hypothesis is accepted.

3. On the various sub-scales of the Test of Counselor Attitudes:

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;

The null hypothesis is partially rejected as a difference significant at the .05 level of confidence was found in the Probing and Interpretive sub-scales of the TCA.

- (b) Change II in the experimental group will not differ significantly from Change I in the control group;

The null hypothesis is accepted.

- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

The null hypothesis is accepted.

4. On the various sub-scales of the Personal Orientation Inventory:

- (a) Change I in the experimental group will not differ significantly from Change I in the control group;

The null hypothesis is accepted.

- (b) Change II in the experimental group will not differ significantly from Change I in the control group;

The null hypothesis is partially rejected as significant differences were found to exist at the .05 level of confidence on the Time, Self-Acceptance, and Capacity for Intimate Contact sub-scales of the Personal Orientation Inventory.

On the Existentiality, Spontaneity, Self Regard, Nature of Man, and Synergy sub-scales of the POI, differences were found at the .01 level of confidence.

- (c) Change I in the experimental group will not differ significantly from Change II in the experimental group.

The null hypothesis is accepted.

5. On the Counselor Rating Blank, the pre-test mean scores will not differ significantly from the mean post-test scores.

The null hypothesis is accepted.

Part II

1. There are no significant differences in criterion scores (post-test minus pre-test) between levels of treatments (a) L_1 and L_2 , (b) C_1 and C_2 , (c) I_1 and I_2 , (d) T_1 and T_2 for students with the same scores on the concomitant variables (pre-test scores).

The hypothesis is partially rejected as there were differences which were significant at the .01 level of confidence between the L_1 and L_2 levels of treatment on the Expressed Inclusion sub-scale of the FIRO-B, the Self-Image Questionnaire (Self and Social), and on the Counselor Rating Blank. There were significant differences (.01 level) between the C_1 and C_2 levels of treatment on the CRB. There were also differences between the I_1 and I_2 levels of treatment on the Expressed Control sub-scale of the FIRO-B (significant at .05 level) and on the Self-Image - Social, and the CRB (significant at .01 level).

2. Any criterion score differences between treatment levels for any independent variable (L, C, I, or T) do not differ significantly between the treatment levels of any of the other three independent variables with which it exists in combination.

The null hypothesis is accepted.

Recommendations

1. It is recommended that, if in fact these kinds of behavioral changes are desirable and expected outcomes of a counselor education program, then the actual instructional nature of the program should be so designed as to produce these outcomes

in counselor trainees.

2. Perhaps a more meaningful manner of studying the degree of success of counselor education programs would be to identify desirable counselor behavior at the conclusion of the program and then to investigate the significant events which produced that behavior. The investigator submits that a study of this design would be of value but that it should be delimited in scope more than the present study.
3. Since the data from this study indicates that the practicum and group counseling experiences are significant aspects of the counselor training program, it is recommended that all counselor education programs keep these activities under constant surveillance to insure the changes expected of counselors-in-training.
4. It is recommended that group counseling courses which are offered as part of counselor training programs should be based on a full model (using a variety of techniques and activities in a single course). It would also seem more profitable to offer these courses during fall-spring semesters, rather than during the summer sessions.

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Appendix A

To test part (a) or (b) of hypotheses 1-4, the following n dimensional vectors were generated, where n is the total number of subjects in the experimental and control groups:

Y = a vector of "change scores" (test b-test a for experimental groups if part (a) is tested; test c-test b for experimental group if part (b) is tested; "change I" for control group (which is only tested twice).

$X^{(1)}$ = a vector whose elements contain 1 if the related element in Y is an experimental subject, otherwise 0.

$X^{(2)}$ = a vector whose elements contain 1 if the related element in Y is a control subject, otherwise 0.

$X^{(3)}$ = a vector whose elements contain the pre-test scores used in calculating vector Y ; point (a) for Change I or point (b) for Change II.

$X^{(4)} = X^{(1)}$ multiplied by $X^{(3)}$; pre-test score for experimental subjects, 0 for control subjects.

$X^{(5)} = X^{(2)}$ multiplied by $X^{(3)}$; pre-test scores for subjects, 0 for experimental subjects.

A full model would be

$$Y = a_0 V + a_1 X^{(1)} + a_2 X^{(2)} + a_4 X^{(4)} + a_5 X^{(5)} + e$$

where coefficients "a" minimize the sum of the squared elements of e , the "error" vector, through a least squares solution.

Before testing the main hypothesis concerned with group differences, it is necessary to establish that the relationship between Y and the pre-test scores is not significantly different for the two groups. This hypothesis, stated in terms of the full model is

$$a_4 = a_5 = b_3$$

and when this restriction is placed on the full model, the restricted model

$$Y = b_0 U + b_1 X^{(1)} + b_2 X^{(2)} + b_3 X^{(3)} + f$$

is obtained.

Letting $Q_1 = \sum_{i=1}^n e_i^2$ and $Q_2 = \sum_{i=1}^n f_i^2$ the F ratio

$$F = \frac{(Q_2 - Q_1) / 1}{Q_1 / (n-4)}$$

with d.f. equal to $1/(n-4)$, provides a test.

If not rejected, the main hypothesis may be tested by placing the following restriction on the previously restricted model, which now is considered the "full" model:

$$b_1 = b_2 = b_0$$

This yields a new restricted model

$$Y = b_0 U + cX^{(3)} + g$$

where U is a vector with 1 in all elements $(X^{(1)} + X^{(2)})$.

Letting $Q_3 = \sum_{i=1}^n g_i^2$, this hypothesis may be tested by the F ratio

$$F = \frac{(Q_3 - Q_2) / 1}{Q_2 / (n-3)}$$

with d.f. equal $1/(n-3)$. This is equivalent to an analysis of covariance and "controls" for different pre-test score levels.

Appendix B

To simplify this presentation and keep the resulting equations within the page size of this report, these analyses are presented with five concomitant variables. The actual analyses used ten concomitant variables. The extension is straight forward.

With reference to Figure 1, and the 10 cells represented, consider the following vectors:

Y = criterion scores

$X^{(1)}$ = elements contain 1 if the corresponding element in Y is for a subject from cell (1), otherwise 0

$X^{(2)}$ = elements contain 1 if the corresponding element in Y is for a subject from cell (2), otherwise 0

.

.

$X^{(10)}$ = elements contain 1 if the corresponding element in Y is for a subject from cell (10), otherwise 0

$X^{(11)}$ = score on concomitant variable 1 if corresponding element in vector Y is for a subject from cell (1), otherwise 0

.

.

$X^{(20)}$ = score on concomitant variable 1 if corresponding element in Y is for a subject from cell (10), otherwise 0

$X^{(21)}$ = score on concomitant variable 2 if corresponding element in Y is for a subject from cell (1), otherwise 0

.

.

$X^{(30)}$ = score on concomitant variable 2 if corresponding element in Y is for a subject from cell (10), otherwise 0

.

.

$X^{(31)}$ = score on concomitant variable 3 if corresponding element in Y is for a subject from cell (1), otherwise 0

$X^{(40)}$ = score on concomitant variable 3 if corresponding element in Y is for a subject from cell (10), otherwise 0

$X^{(41)}$ = score on concomitant variable 4 if corresponding element in Y is for a subject from cell (1), otherwise 0

.

$X^{(50)}$ = score on concomitant variable 4 if corresponding element in Y is for a subject from cell (10), otherwise 0

$X^{(51)}$ = score on concomitant variable 5 if corresponding element in Y is for a subject from cell (1), otherwise 0

.

$X^{(60)}$ = score on concomitant variable 5 if corresponding element in Y is for a subject from cell (10), otherwise 0

All vectors are of length n, where n = total number of subjects. To test the first hypothesis for the "L effect," 1(a), let

$$Z^{(1)} = \sum_{i=1}^8 X^{(i)}$$

$$Z^{(2)} = \sum_{i=11}^{18} X^{(i)}$$

$$Z^{(3)} = \sum_{i=21}^{28} X^{(i)}$$

$$Z^{(4)} = \sum_{i=31}^{38} X^{(i)}$$

$$Z^{(5)} = \sum_{i=41}^{48} X^{(i)}$$

$$Z^{(6)} = \sum_{i=51}^{58} X^{(i)}$$

$$Z^{(7)} = X^{(9)} + X^{(10)}$$

$$Z^{(8)} = X^{(19)} = X^{(20)}$$

$$Z^{(9)} = X^{(29)} + X^{(30)}$$

$$Z^{(10)} = X^{(39)} + X^{(40)}$$

$$Z^{(11)} = X^{(49)} + X^{(50)}$$

$$Z^{(12)} = X^{(59)} + X^{(60)}$$

A least squares solution for the coefficients of the following "full model" would be obtained.

$$Y = a_0 U + a_1 Z^{(1)} + a_2 Z^{(2)} + \dots + a_{12} Z^{(12)}$$

where U = a vector with 1 in each element.

Before testing the main hypotheses, it is necessary to establish that the relationship between the criterion and each concomitant variable is the same in each of the groups; i.e., the change in Y per unit change in any concomitant variable is the same for those with treatment L_1 and L_2 . This would require the following restrictions to be placed on the full model, for concomitant variable one

$$H_{01}: a_2 = a_8 = b_1$$

and yields the restricted model

$$Y = a_0 U + a_1 Z^{(1)} + a_3 Z^{(3)} + \dots + a_7 Z^{(7)} + a_9 Z^{(9)} + \dots + a_{12} Z^{(12)} + b_1 T^{(1)}$$

where $T^{(1)} = Z^{(2)} + Z^{(8)}$. Comparison of the squared multiple correlation coefficients associated with the full and restricted models yields an F ratio by which this hypothesis can be tested.

$$F = \frac{(R_F^2 - R_R^2) / 1}{(1 - R_F^2) / (n - 12)}, \text{ d.f.} = (n - 12)$$

Similar models were constructed for each of the remaining concomitant variables and compared with the full model, using the following restrictions and vector combinations substituted for b and $T^{(1)}$

$$H_{02}: a_3 = a_7 = b_2$$

$$T^{(2)} = Z^{(3)} + Z^{(9)}$$

$$H_{03}: a_4 = a_{10} = b_3$$

$$T^{(3)} = Z^{(4)} + Z^{(10)}$$

$$H_{04}: a_5 = a_{11} = b_4$$

$$T^{(4)} = Z^{(5)} + Z^{(11)}$$

$$H_{05}: a_6 = a_{12} = b_5$$

$$T^{(5)} = Z^{(6)} + Z^{(12)}$$

If the above hypotheses are not rejected, i.e., the relationship between each concomitant variable and the criterion variable may be considered the same in each group, then common regression slopes may be considered and a new full model developed.

$$Y = a_0 U + a_1 Z^{(1)} + a_7 Z^{(7)} + b_1 T^{(1)} + \dots b_5 T^{(5)}$$

The main hypothesis may be expressed as the following restriction:

$$H_{1a}: a_1 = a_7 = C_1$$

yielding the restricted model

$$Y = a_0 U + c_1 S^{(1)} + b_1 T^{(1)} + \dots b_5 T^{(5)}$$

$$\text{where } S^{(1)} = Z^{(1)} + Z^{(7)}$$

$$F = \frac{(R_F^2 - R_R^2) / 1}{(I - R_F^2) / (n-7)}$$

and d.f. = 1/(n-7)

For hypotheses 1 (b), 1 (c), and 1 (d), the same analyses were performed with the z vectors defined as follows:

Hypothesis 1 (b)

$$Z^{(1)} = X^{(1)} + X^{(2)} + X^{(5)} + X^{(6)}$$

$$Z^{(2)} = X^{(11)} + X^{(12)} + X^{(15)} + X^{(16)}$$

$$\begin{aligned}
Z^{(3)} &= X^{(21)} + X^{(22)} + X^{(25)} + X^{(26)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(6)} &= X^{(51)} + X^{(52)} + X^{(55)} + X^{(56)} \\
Z^{(7)} &= X^{(3)} + X^{(4)} + X^{(9)} + X^{(7)} + X^{(8)} + X^{(10)} \\
Z^{(8)} &= X^{(13)} + X^{(14)} + X^{(19)} + X^{(17)} + X^{(18)} + X^{(20)} \\
Z^{(9)} &= X^{(23)} + X^{(24)} + X^{(29)} + X^{(27)} + X^{(28)} + X^{(30)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(12)} &= X^{(53)} + X^{(54)} + X^{(59)} + X^{(57)} + X^{(58)} + X^{(60)}
\end{aligned}$$

Hypothesis 1 (c)

$$\begin{aligned}
Z^{(1)} &= X^{(1)} + X^{(3)} + X^{(5)} + X^{(7)} \\
Z^{(2)} &= X^{(11)} + X^{(13)} + X^{(15)} + X^{(17)} + X^{(19)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(6)} &= X^{(51)} + X^{(53)} + X^{(55)} + X^{(57)} + X^{(59)} \\
Z^{(7)} &= X^{(2)} + X^{(4)} + X^{(6)} + X^{(8)} + X^{(9)} + X^{(10)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(12)} &= X^{(52)} + X^{(54)} + X^{(56)} + X^{(58)} + X^{(60)}
\end{aligned}$$

Hypothesis 1 (d)

$$\begin{aligned}
Z^{(1)} &= X^{(1)} + X^{(2)} + X^{(3)} + X^{(4)} + X^{(9)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(6)} &= X^{(51)} + X^{(52)} + X^{(53)} + X^{(54)} + X^{(59)} \\
Z^{(7)} &= X^{(5)} + X^{(6)} + X^{(7)} + X^{(8)} + X^{(10)} \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot &\quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
Z^{(12)} &= X^{(55)} + X^{(56)} + X^{(57)} + X^{(58)} + X^{(60)}
\end{aligned}$$

Hypothesis two would seemingly consist of six sub-hypotheses,

since each independent variable is analyzed in combination with each other independent variable. Since the second level of the first treatment, L_2 , does not exist in combination with the first level of treatments C and I, only the following combinations may be examined.

L versus T
C versus I
C versus T
I versus T

E.G., to test the hypothesis that the difference between levels 1 and 2 of treatment I are the same for the levels of treatment C, the following vectors would be required.

$$V^{(1)} = X^{(1)} + X^{(5)}$$

$$V^{(2)} = X^{(2)} + X^{(6)}$$

$$V^{(3)} = X^{(3)} + X^{(7)}$$

$$V^{(4)} = X^{(4)} + X^{(8)} + X^{(9)} + X^{(10)}$$

The appropriate full model is then

$$Y = a_0 U + d_1 V^1 + d_2 V^2 + d_3 V^3 + d_4 V^4 + b_1 T^1 + \dots + b_5 T^5$$

and the restriction

$$d_1 - d_2 = d_3 - d_4 = e_1$$

expresses the hypothesis and algebraically yields the restricted model

$$Y = a_0 U + e_1 P^{(1)} + d_2 P^{(2)} + d_4 P^{(3)} + b_1 T^{(1)} + \dots + b_5 T^{(5)}$$

where

$$P^{(1)} = V^{(1)} + V^{(3)}$$

$$P^{(2)} = V^{(1)} + V^{(2)}$$

$$P^{(3)} = V^{(3)} + V^{(4)}$$

A comparison of the models yields

$$F = \frac{(R_F^2 - R_R^2) / 1}{(1 - R_F^2) / (n-9)} \quad \text{with d.f.} = 1/(n-9).$$

Similar analyses were performed for the other three combinations with the V vectors defined as follows:

Hypothesis for L versus T combination

$$V^{(1)} = X^{(1)} + X^{(2)} + X^{(3)} + X^{(4)}$$

$$V^{(2)} = X^{(9)}$$

$$V^{(3)} = X^{(5)} + X^{(6)} + X^{(7)} + X^{(8)}$$

$$V^{(4)} = X^{(10)}$$

Hypothesis for C versus T combination

$$V^{(1)} = X^{(1)} + X^{(2)}$$

$$V^{(2)} = X^{(5)} + X^{(7)}$$

$$V^{(3)} = X^{(3)} + X^{(4)} + X^{(9)}$$

$$V^{(4)} = X^{(7)} + X^{(8)} + X^{(10)}$$

Hypothesis for I versus T combination

$$V^{(1)} = X^{(1)} + X^{(3)}$$

$$V^{(2)} = X^{(2)} + X^{(4)} + X^{(9)}$$

$$V^{(3)} = X^{(5)} + X^{(7)}$$

$$V^{(4)} = X^{(6)} + X^{(8)} + X^{(10)}$$